

IMPORTANT BIRD AND BIODIVERSITY AREAS IN INDIA

Priority sites for Conservation

Revised and updated 2nd Edition Vol. II



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**Second Edition: Revised and Updated
Volume II**

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RAJASTHAN



IN-RJ

DHRTIMAN MUKHERJEE

Thar is one of the smallest deserts in the world but has a very high cultural and biological diversity

Rajasthan (23° 4'–30° 11' North and 69° 29'–78° 17' East) with an area of 34.22 million ha, which constitutes 10.41 % of the land area of the country, is one of the largest states of India.

Rajasthan, which means 'adobe of kings', is punctuated by beautiful palaces that speak for the ancient glory. The state comes alive with vibrant colours of tradition splashed against the backdrop of the desert sand

The panoramic view of the state with its lofty Aravalli Hills and the golden sand dunes of the Great Indian Desert, commonly known as the Thar Desert, is mesmerising. The land is endowed with a rich culture, heritage, natural beauty and resources. This princely state is one of the most exotic locales for tourists the world over. It is so rich in history that every village has its own tales of valour and sacrifice whether it is for the sake of the nation or for conservation of wildlife. It is a land which boasts of fearless warriors like Maharana Pratap who defended the region against enemies and the Bishnois (a community of northwestern Rajasthan) who strove for the conservation of nature.

History indicates that the land was once full of wild fauna. The wetlands had a large number of waterbirds. The

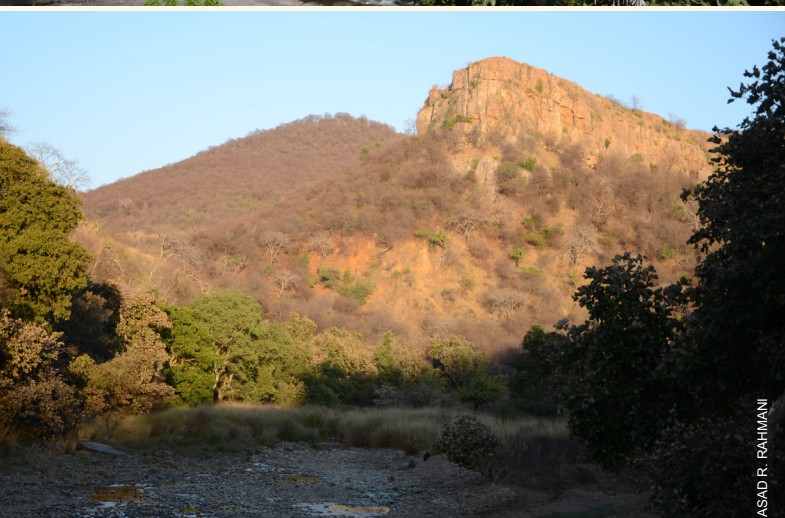
green forests of the Aravallis and the eastern half of the state were full of big cats and birds which is evident from the old photographs of Maharajas and the old paintings of royals who went on shikar (hunting) frequently.

The state can be divided into four major physiographic regions: (a) western desert with barren hills, level, rocky and sandy plains, (b) the Aravalli Hills running southwest to northeast starting from Gujarat and ending in Delhi, (c) the eastern plains with rich alluvial soil and (d) the southeastern plateau. The major rivers of the state are the Mahi, Chambal and Banas.

The Thar Desert: Indian or Thar Desert is one of the smallest deserts in the world, but most thickly populated. The Thar desert is located at the crossing where the Palaearctic, Oriental and Saharan elements of biodiversity are found (Baqri and Kankane 2002). The Thar is also known for its great civilisations in Ghaggar and Indus river basins. It occupies about 9% of India's geographical area and covers 208,751 sq. km in Rajasthan alone (Rahmani 1997a). The desert extends to Ferozepur, Sangrur and Bhatinda districts of Punjab in the north and to Mahendragarh and Hissar districts of Haryana in the northeast. The major part of the Thar is occupied either by

dry open grassland or by grassland interspersed with trees and thorny bushes (Gupta 1975). The main grass type of the Thar is *Dichanthium-Lasiurus-Cenchrus* (Dabadghao and Shankarnarayan 1973). Bhandari in 1990 wrote: “In general the vegetation in the arid region is sparse. Plants with only xerophytic adaptations are able to establish themselves. The bulk of the vegetation consists of stunted, thorny or prickly shrubs and perennial herbs capable of drought resistance.” Nearly 58% of the Thar is covered with sand dunes and interdunal valleys. Many shifting dunes which have stabilised are covered with *Capparis decidua*, *Calotropis*

The mammalian fauna of the Thar Desert is diverse with nearly 68 species. Two major carnivores, the Asiatic Lion *Panthera leo persica* and the Asiatic Cheetah *Acinonyx jubatus venaticus*, have become extinct during the last 100 years. Indian Wild Ass *Equus hemionus khur* that was not seen in Rajasthan for almost four decades has been recently sighted (Sangha 2003). Except for Chinkara *Gazella bennetti* and in some areas Blackbuck *Antelope cervicapra*, the status of all the larger mammals is unsatisfactory and a few like Caracal *Felis caracal* are highly threatened. Of the 68 species, 29 species are listed



Whenever tourists think of Rajasthan, they connect it with rolling sand dunes but not many people know that Rajasthan has Tropical Evergreen Forest, Tropical Dry Deciduous Forests, Tropical Thorn Forest and Savanna grasslands

procera, *Calligonum polygonoides*, *Acacia senegal*, *Prosopis cineraria*, *Aerva javanica*, *Aristida adscensionis* and other psammophytic species (Shetty 1994).

There are several saline depressions in the Thar with characteristic halophytic vegetation. The major grasses and sedges are *Eleusine compressa*, *Eragrostis ciliaris* and *Dactyloctenium aegyptium*. The most famous saline depressions are Talchapar, Didwana, Pachpadra, Lunkaransar and Kuchaman.

in the Indian Wildlife (Protection) Act, and hence, need protection.

Chinkara and Blackbuck are considered sacred by the Bishnoi community and hence are present in large numbers around Bishnoi villages. The Blue Bull or Nilgai *Boselephus tragocamelus* has a wide distribution in eastern Rajasthan. In the extreme arid parts of the Thar Desert where the Blackbuck was not found naturally, it is now increasingly seen, thanks to the availability of water and development

of agriculture fields. Blackbuck has not yet spread in the arid Thar Desert as Nilgai has done. Another species that is spreading in the Thar Desert is Wild Boar *Sus scrofa*.

Aravalli Hills: The Aravalli Hills run diagonally across the state from northeast Delhi to the southwest up to the plains of Gujarat, covering a distance of about 692 km with an average height of 600 m above msl. Within Rajasthan state, the ranges run from Khetri in the northeast to Khed Brahma in the southwest for a length of about 550 kms. The southwest part has prominent peaks, the highest being Guru Shikhar (1,727 m) in Mount Abu. It is the major

Banas plain region is broad with an altitude of 150 to 300 msl, sloping towards the east. The plain is drained by the Banas river in the northern part of Chittorgarh and Udaipur districts and several of its tributaries. Banas is the major tributary of the Chambal river which ultimately joins the Yamuna river. The alluvium deposits become thin towards the west where the plain is higher and more irregular, while in the east the thickness of alluvium increases. Another zone comprises the Chappan plains which lie in the southeastern part of Udaipur, Banswara, Dungarpur districts and in the southern part of Chittorgarh district. The area is drained by



DHRITIMAN MUKHERJEE

Bishnoi are famous for protecting Blackbuck and Chinkara. Very high density of Chinkara is found in many Bishnoi areas, much more than in any protected area

water divide within the state. The area to its east is well drained by several integrated drainage systems, while the area to the west has only one integrated drainage system, i.e. the Luni drainage system in the southeastern part of the desert. The Mewar and Marwar hills are off-shoots of the Aravallis.

Eastern Plains: The eastern plains have rich alluvial soils drained by seasonal rivers. They cover most of Alwar, Bharatpur, Sawai Madhopur, Bundi and Kota districts. The

the tributaries of the Mahi river which ultimately reaches the Arabian Sea through the Gulf of Cambay.

Southeastern Plateau: Southern and southeastern Rajasthan is mostly a plateau. The Hadoti plateau, with intrusions of black volcanic rocks into the Vindhya, extends to a great part of Jhalawar, Baran and Kota districts. The Malwa plateau also extends into the southern part of Chittorgarh and Banswara districts; the average altitude is 500 msl and the plateau is dotted with isolated low ranges



Asiatic Wild Cat *Felis sylvestris*, also called Desert Cat in some arid zones, is widespread in Rajasthan. It often interbreeds with domestic cats, so hybrids are found around settlements. The best area to see this elusive feline is Desert NP

in some parts. This plateau in Rajasthan occurs in the upper catchment of the Chambal river to the southeast of the Mewar plains. The greater part of this area is drained by the Chambal river and its right bank tributaries like the Kali Sindh, Parwan and Parvati.

The climate of Rajasthan varies from semi-arid to arid. The temperature in the state ranges from 2 °C to 50° C. The rainfall ranges from as low as 150 mm in the arid regions to 1,000 mm in the southeastern plateau.

The total population of Rajasthan is 68.58 million (2011 census), which constitutes 5.5% of the country's population. Of the total population, 76.6% is rural and 23.4% urban. The population density is 200 persons per sq. km. (Census 2011) Link: http://www.dataforall.org/dashboard/censusinfoindia_pca/ (As accessed in December 2014)

Vegetation

The total forest cover of Rajasthan is 32,737 sq km which is 4.24% of India's forest cover. 94.07% area of Rajasthan is non-forest area. The highest forest cover is observed in Chittorgarh district (Ministry of Environment and Forest 2011). By legal status Reserved Forest constitutes 36.5%, Protected Forest 54.3% and Unclassed Forest 9.2% (Ministry of Environment and Forest 2001). There are two

forest types, namely Tropical Dry Deciduous and Tropical Thorn Forest. Forests are mostly confined to the eastern and southern parts of the state. The western part of the state is devoid of forests because of the prevalence of hot arid conditions. In Banswara and Jhalawar, forest cover has remained unchanged, and all other districts reflect an increase in cover. A significant increase has been registered in Kota, Tonk, Bundi, Chittorgarh, Jhunjunu and Bhilwara (Ministry of Environment and Forest 2001). The increase in forest cover is mainly due to plantations raised under various projects such as the Aravalli Afforestation project, the Indira Gandhi Canal project and the Desert Development programme. The important species of plantations are *Acacia* spp., *Dalbergia sissoo* and *Azadirachta indica*. Protection of the forests by raising *Prosopis chilensis* (= *juliflora*) along the fences has also contributed to the increase of forest cover (Ministry of Environment and Forest 2001).

IBAs and Protected Areas

There are five national parks and 25 wildlife sanctuaries, covering an area of 0.96 million ha, which constitutes 2.80% of the geographical area of the state. Mukundar Hill National Park, established in 2006 and consisting of 200.54 sq. km in Kota and Chittorgarh district is the latest national park of

IBAs of Rajasthan		
IBA site codes	IBA site names	IBA criteria
IN-RJ-01	Alniya Dam	A1, A4iii
IN-RJ-02	Bardha Dam Reservoir	A1, A3, A4i
IN-RJ-03	Desert National Park	A1, A3
IN-RJ-04	Diyatra (IBA in Danger)	A1
IN-RJ-05	Gagwana Arain, Mangaliyawas, Ramsar, Goyal, Ratakot, Badar (IBA in Danger)	A1
IN-RJ-06	Jaisamand Lake and Wildlife Sanctuary	A1, A4i, A4iii
IN-RJ-07	Keoladeo National Park	A1, A4i, A4iii
IN-RJ-08	Khichan	A1, A4i
IN-RJ-09	Kumbalgarh Wildlife Sanctuary	A1, A3
IN-RJ-10	Mount Abu Wildlife Sanctuary	A1, A3
IN-RJ-11	National Chambal Wildlife Sanctuary	A1, A4iii
IN-RJ-12	Phulwari Wildlife Sanctuary	A1
IN-RJ-13	Ram Sagar Lake (Hindoli)	A1, A4iii
IN-RJ-14	Ranthambore Tiger Reserve	A1, A3
IN-RJ-15	Sajjanganrh Wildlife Sanctuary	A1, A3
IN-RJ-16	Sambhar Lake	A1, A4i, A4iii
IN-RJ-17	Sareri (Bandh) Dam	A1, A4iii
IN-RJ-18	Sariska Tiger Reserve	A1, A3
IN-RJ-19	Sei Reservoir	A1
IN-RJ-20	Sitamata Wildlife Sanctuary	A1, A3
IN-RJ-21	Sonkhaliya Closed Area	A1
IN-RJ-22	Tal Chhapar Wildlife Sanctuary	A1
IN-RJ-23	Udaipur Lakes Complex	A1, A4i
IN-RJ-24	Bagdarrah Nature Park	A1, A3
IN-RJ-25	Badopal Lake	A1, A4iii
IN-RJ-26	Jawahar Sagar Sanctuary	A1, A4i
IN-RJ-27	Jawai Dam Leopard Conservation Reserve	A1, A4iii
IN-RJ-28	Jor Beer	A1, A4i
IN-RJ-29	Kharda Dam	A1, A4iii
IN-RJ-30	Menar Lake complex	A1, A4iii
IN-RJ-31	Sardar Samand Lake	A1, A4iii

Rajasthan. Ranthambore and Sariska, two tiger reserves, are identified IBAs. Keoladeo National Park in Bharatpur district is of international importance for its rich avifauna. This site meets all the four criteria of an IBA. Keoladeo is World Heritage Site, Ramsar Site and outstanding IBA of India. Another IBA which is also a Ramsar site is the Sambar Lake. Islam and Rahmani (2008) have identified eight more sites that qualify Ramsar criteria. In addition to national parks and sanctuaries, there are ten Conservation Reserves, out of which two, Jor Beer and Jawai Dam Leopard Conservation Reserves, have been identified as IBAs.

In 2004, 24 sites were listed as IBAs (Islam and Rahmani 2004). Since then based on information available to us, eight new sites have been added. There are another six potential IBAs but since we could not get sufficient information about bird life, we have not included them in this inventory. Some IBAs such as Diyatra (IN-RJ-04) and Gawana (IB-RJ-05) have deteriorated and the trigger species for which they were identified initially have declined or disappeared

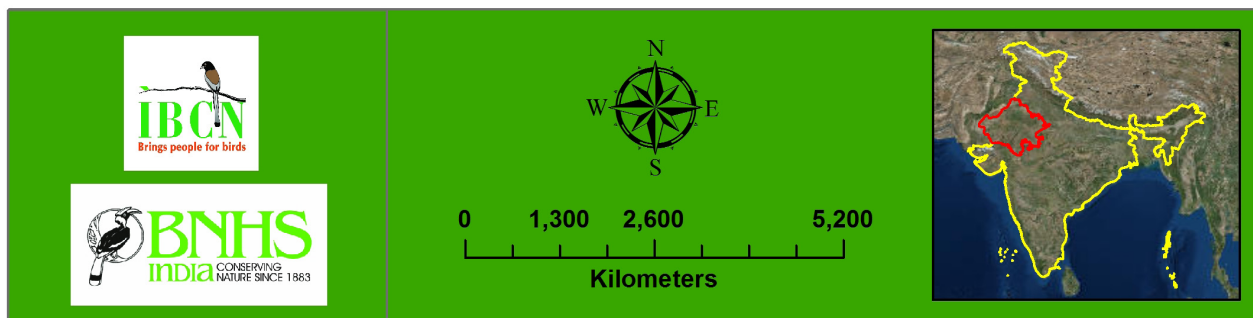
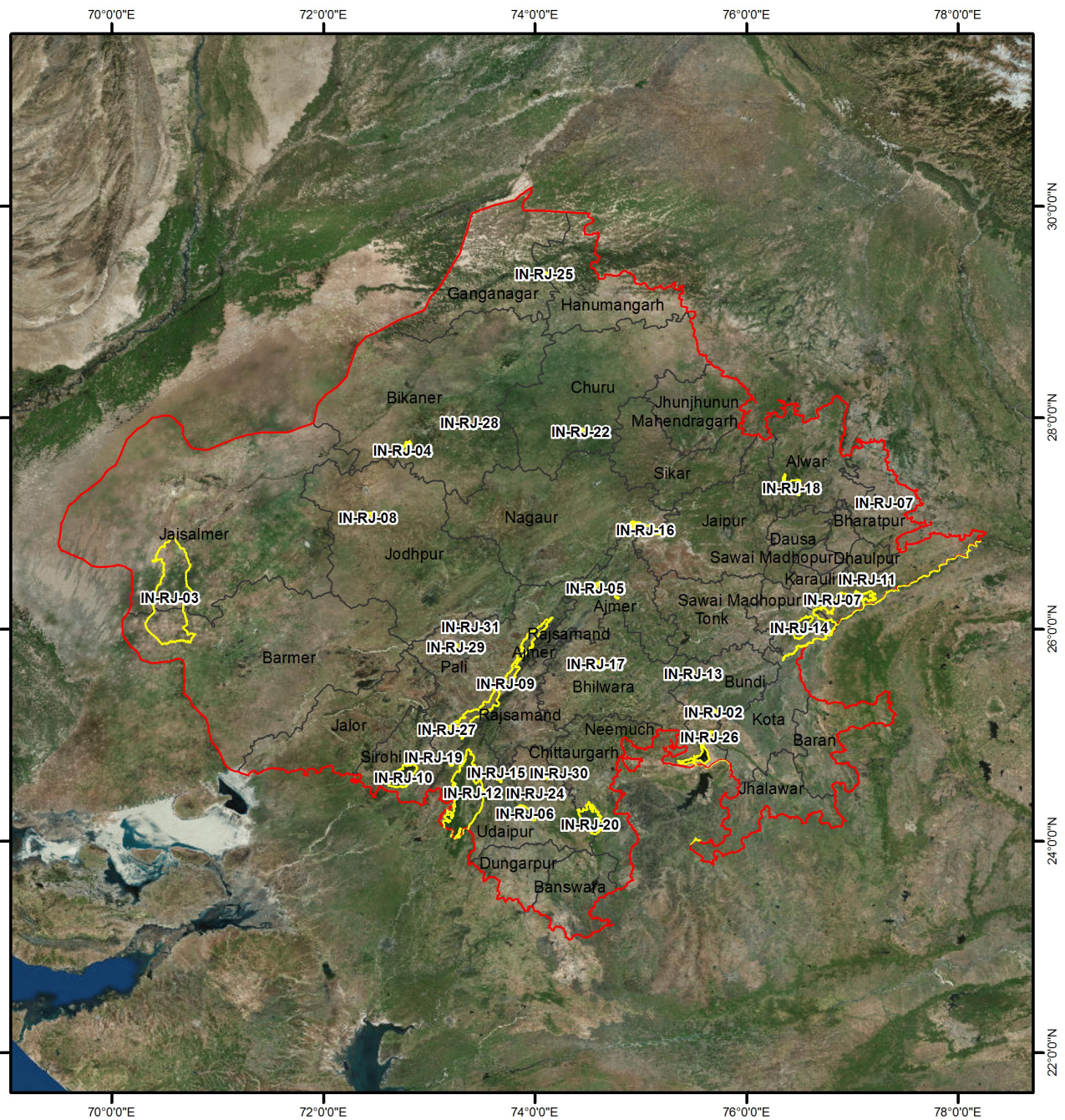
totally. So such sites are considered *IBA in Danger*. In the future inventory they probably have to be deleted from the list. Few others have partially declined as far as their biodiversity values are concerned (e.g. Alniya Dam, Bardha Dam, Ramsagar Dam), but with proper attention, they could be revived to their former glory.

AVIFAUNA

In a recent book by Rakesh Vyas published by BNHS and OUP, 475 species have been described from Rajasthan (Vyas 2013). He has also added six more species which need further confirmation. There is no endemic bird in Rajasthan that is confined to the state although we have some species which are largely found in Rajasthan such as Green Munia *Amandava formosa* and White-browed Bushchat *Saxicola macrorhynchus*.

Almost 60 % of the geographical area of Rajasthan is under desert. The remainder is hilly terrain along with plateau in the southeastern parts, and plains in the

Important Bird Areas in Rajasthan





DHRITIMAN MUKHERJEE

Desert Fox or Red Fox *Vulpes vulpes* (above) and Indian Fox *Vulpes bengalensis* (below) often occur in the same area, but Desert Fox is more common in the Thar Desert, while the Indian Fox is more common in the Aravallis and Eastern Rajasthan



DHRITIMAN MUKHERJEE

LIST OF THREATENED BIRDS WITH IBA SITE CODES

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>	IN-RJ-01, 02, 03, 04, 06, 07, 08, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24 (mainly old records), 25, 26, 27, 28, 30, 31
Long-billed Vulture	<i>Gyps indicus</i>	IN-RJ-01, 03, 04, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24 (mainly old records), 25, 26, 28, 29, 31
Red-headed Vulture	<i>Sarcogyps calvus</i>	IN-RJ-01, 02, 03, 06, 07, 09, 10, 11, 12, 14, 15, 16, 18, 19, 20, 21, 22 (mainly old records), 24, 25, 26, 28, 29, 31
Baer's Pochard	<i>Aythya baeri</i>	IN-RJ-07
Great Indian Bustard	<i>Ardeotis nigriceps</i>	IN-RJ-03, 04, 21
Sociable Lapwing	<i>Vanellus gregarius</i>	IN-RJ-07, 16, 22, 29

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>	IN-RJ-01, 02, 03, 04, 06, 07, 10, 11, 13, 14, 16, 18, 19, 20, 21, 22, 24 (mainly old records), 25, 26, 27, 28, 30, 31
Lesser Florican	<i>Sypheotides indica</i>	IN-RJ-05, 21
Black-bellied Tern	<i>Sterna acuticauda</i>	IN-RJ-01, 02, 07, 11, 13, 14, 18

VULNERABLE

Dalmatian Pelican	<i>Pelecanus crispus</i>	IN-RJ-01, 02, 07, 11, 16, 17, 18, 31
Asian Woollyneck	<i>Ciconia episcopus</i>	IN-RJ-01, 02, 07, 9, 10, 11, 14, 16, 18, 25, 27
Lesser Adjutant	<i>Leptoptilos javanicus</i>	IN-RJ-07, 14
Lesser White-fronted Goose	<i>Anser erythropus</i>	IN-RJ-07
Marbled Teal	<i>Marmaronetta angustirostris</i>	IN-RJ-07, 31
Pallas's Fish-Eagle	<i>Haliaeetus leucoryphus</i>	IN-RJ-07, 11, 16, 28
Greater Spotted Eagle	<i>Clanga clanga</i>	IN-RJ-03, 07, 11, 18, 28
Indian Spotted Eagle	<i>Aquila hastata</i>	IN-RJ-07, 11
Eastern Imperial Eagle	<i>Aquila heliaca</i>	IN-RJ-01, 07, 11, 14, 18, 22, 28
Sarus Crane	<i>Grus antigone</i>	IN-RJ-01, 02, 05, 07, 09, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 23, 24, 26, 27, 29, 30, 31
MacQueen's Bustard	<i>Chlymadotis macqueenii</i>	IB-RJ-03, 04, 16, 21
Yellow-eyed Pigeon	<i>Columba eversmanni</i>	IB-RJ-22, 28
Indian Skimmer	<i>Rynchops albigollis</i>	IN-RJ-01, 07, 09, 11, 30
White-browed Bushchat	<i>Saxicola macrorhyncha</i>	IN-RJ-03, 04, 07, 08, 14, 21, 22
Pied Tit	<i>Parus nuchalis</i>	IN-RJ-09, 10, 12, 15, 16, 19, 23, 24, 30
Green Munia	<i>Amandava formosa</i>	IN-RJ-09, 10, 11, 15, 19, 23, 24

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>	IN-RJ-07, 11, 23, 27, 30
Oriental Darter	<i>Anhinga melanogaster</i>	IN-RJ-01, 02, 06, 07, 09, 10, 11, 12, 14, 16, 18, 20, 23, 25, 27, 30, 31,
Painted Stork	<i>Mycteria leucocephala</i>	IN-RJ-01, 02, 06, 07, 09, 11, 12, 14, 16, 18, 20, 21, 23, 25, 26, 27, 30
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	IN-RJ-01, 02, 06, 07, 11, 14, 20, 23, 25, 30
Black-headed Ibis	<i>Threskiornis melanocephalus</i>	IN-RJ-01, 02, 06, 07, 09, 11, 12, 14, 18, 19, 20, 21, 26, 27, 29, 30, 31
Lesser Flamingo	<i>Phoenicopus minor</i>	IN-RJ-07, 09, 11, 16, 23, 25, 27, 30
Falcated Duck	<i>Anas falcata</i>	IN-RJ-07
Ferruginous Pochard	<i>Aythya nyroca</i>	IN-RJ-01, 02, 06, 07, 11, 12, 14, 16, 20, 23, 25, 27, 30
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaeus</i>	IN-RJ-07, 18
Lesser Fish-eagle	<i>Ichthyophaga humilis</i>	IN-RJ-07
Cinereous Vulture	<i>Aegypius monachus</i>	IN-RJ-03, 04, 07, 09, 14, 16, 21, 22, 27, 28, 31
Himalayan Vulture	<i>Gyps himalayensis</i>	IN-RJ-28
Red-headed Falcon	<i>Falco chicquera</i>	IN-RJ-07, 10, 11, 15, 16, 18
Pallid Harrier	<i>Circus macrourus</i>	IN-RJ-07, 11, 16, 22, 23, 26
Laggar Falcon	<i>Falco jugger</i>	IN-RJ-07, 09, 11, 12, 16, 18, 20, 22, 27
River Tern	<i>Sterna aurantia</i>	IN-RJ-01, 02, 06, 09, 10, 11, 12, 14, 19, 20, 22, 25, 26, 27, 29, 31
Black-tailed Godwit	<i>Limosa limosa</i>	IN-RJ-01, 02, 07, 09, 11, 12, 16, 18, 20, 25, 27, 30, 31
Great Thick-knee	<i>Esacus recurvirostris</i>	IN-RJ-01, 02, 07, 11, 12, 16, 23, 27, 30
Eurasian Curlew	<i>Numenius arquata</i>	IN-RJ-01, 02, 07, 11, 14, 16, 18, 22, 25, 26,
European Roller	<i>Coracias garrulous</i>	IN-RJ-07
River Lapwing	<i>Vanellus duvaucelli</i>	IN-RJ-07, 11, 17
Alexandrine Parakeet	<i>Psittacula eupatria</i>	IN-RJ-01, 02, 09, 10, 12, 14, 15, 18, 19, 20, 26
European Roller	<i>Coracias garrulus</i>	IN-RJ-07, 09, 10, 12, 16, 19, 20, 22, 27
Tytler's Leaf-warbler	<i>Phylloscopus tytleri</i>	IN-RJ-07

northeastern region. Thus, the avifaunal composition of the state represents species which have mainly adapted to the desert environment with either sandy plains or scrubland as the preferable habitat. The grassland patches in the Eastern Rajasthan hold significant numbers of Lesser Florican *Sypheotides indica*. The Thar desert, despite being one of the smallest deserts of the world, has a high avian diversity. The Thar desert, however, is not isolated as it is connected on the west side to Persian Desert and beyond, hence avian endemism is very low.

Most of the birds of this desert have a wide distribution (Rahmani 1997a). Nearly 300 birds have been recorded in the desert region by various workers such as Adam (1873, 1874), Barnes (1886), Ticehurst (1922), Whistler (1938) and Rahmani (1997b). The most important threatened bird species found

Amandava formosa (Lodhiya 1999) and Pied Tit or White-naped Tit *Parus nuchalis* (Tiwari 2001, Rahmani 2012). The grasslands found near the waterbodies in the eastern half of the Aravallis are also reported to hold few populations of Sarus Crane *Grus antigone*.

The wetlands, wherever they occur in this arid state, are extremely important for waterfowl. Many larger villages and towns have wetlands (e.g. Gajner, Diyatra, Kolayat and Jaisalmer), which may not have more than 20,000 waterfowl in each but in total adds up to several thousand birds. The wetlands of Keoladeo in the eastern plain, a Ramsar site, have also acquired the status of a World Heritage site. The site is famous for holding populations of many globally Threatened species. The Siberian Crane *Leucogeranus leucogeranus* was perhaps the most famous



Besides the famous Bishnois, many communities protect nature and wildlife in Rajasthan. Birds can be approached very close as seen in Mangalwad Talao (wetland) in Chittor district. Salim Ali Community Conservation Award for 2008 was given to people of Kheechan for protecting Demoiselle Cranes



in the desert region is the Great Indian Bustard *Ardeotis nigriceps*, perhaps the rarest bustard of the world.

Nearly 20 years ago, all *Gyps* species of vultures were abundant. It was common to see flocks of 100–150 White-rumped *Gyps bengalensis* and Long-billed *G. indicus* vultures on cattle carcass or sunning after a full meal. Sighting of Red-headed Vulture *Aegypis calvus* and Egyptian Vulture *Neophron percnopterus* was not uncommon; the latter was particularly common on garbage dumps. Such sights have become rare now.

Among the migratory birds, the important species are the Imperial or Black-bellied Sandgrouse *Pterocles orientalis*, Macqueen's Bustard *Chlamydotis macqueeni*, Demoiselle Crane *Grus virgo* and various raptors, larks, pipits, etc. Strangely, there has been a massive decline in the number of Black-bellied Sandgrouse. For example, no individual of this species was seen in a three-week survey of the Thar Desert in 2014 by the BNHS team. In general, there have been a decline of all sandgrouse species in Rajasthan.

The southern hilly tracts of the state are known to hold considerable populations of the Vulnerable Green Munia

one. Unfortunately, it has not been seen since the winter of 2001–2002. Keoladeo is still a heaven for birdwatchers. Sambar Lake in the semi-arid region is another Ramsar site which holds significant congregations of Greater Flamingo *Phoenicopterus roseus* and many waders. The surrounding environs of the lake support Vulnerable bird species of scrubland, namely, the Pied Tit or White-naped Tit *Parus nuchalis*. Khichan in the arid region of the state is known for a large congregation of the winter visitor, the Demoiselle Crane *Grus virgo*.

BIRDS FOR WHICH RAJASTHAN IS IMPORTANT

Great Indian Bustard *Ardeotis nigriceps* Critically Endangered

The Great Indian Bustard is the State Bird of Rajasthan. Despite this exalted status, there has been a massive decline in its numbers. It disappeared from Sorsan Bustard Area in Baran district in the late 1980s, and by 2000, it has almost disappeared from Diyatra IBA. Recent local extinction is from Sonkhaliya area where the last 2–3 birds were seen in



Only emergency conservation measures, including conservation breeding programme, can save the Great Indian Bustard. Its global number could be as low as 200

2013–2014. Based on the survey and mathematical modeling, Dutta *et al.* (2015) estimate that 100–150 individuals are left in the whole Thar Desert.

Lesser Florican *Sypheotides indica* **Endangered**

Old records indicate that the Lesser Florican was once a common monsoon visitor to many parts of eastern, southern and central Rajasthan (Sankaran 1996). Chittorgarh, Bhilwara, Pali, Ajmer and Banswara were the important districts where large numbers of Lesser Florican were said to occur (Sankaran 1996). Beside these, it was found in some parts of Nagaur, Jodhpur, Tonk and Bharatpur districts. But now only four areas (with many sites within them) are known to get a fairly sizeable population of the Florican during the monsoon, two locations in Chittorgarh and one each in Pali and Ajmer (Sankaran 1996). The patches of grasslands in Ajmer, namely Gagwana Arain, Mangaliyawas, Ramsar, Goyal, Ratakot and Bandar together form important sites for the Lesser Florican and due to this, these patches have been collectively identified as an IBA. Beside these sites, Sonkhaliya is the other IBA where this bird is seen. While the latest status in other areas is not known, Sonkhaliya area still gets good number of Lesser Floricans in some years. In a particular grassland area, the number of Floricans varies from year

to year, depending on the rainfall pattern. For example, in a survey conducted in August 2011, Bhardwaj *et al.* (2011) saw only 18 individuals of Lesser Florican in four districts of Rajasthan, which was less than 47% of the sightings reported in 1999. Of the 18 individuals, maximum number of birds were seen in Pratapgarh (earlier part of Chittorgarh) (n=6), followed by 4 in Malpura area of Tonk district, Shahpura area of Bhilwara (n=5) and Sonkhaliya area of Ajmer (n=3). On the other hand, in 2013, according to Gobind Sagar Bhardwaj (*pers. comm.* 2013), nearly 120 male Floricans were seen by the local staff in and around Sonkhaliya. This was mainly due to very good rainfall in the monsoon of 2013 in Sonkhaliya area.

Macqueen's Bustard *Chlamydotis macqueenii* **Near Threatened**

The Macqueen's Bustard is a winter migrant to India (Ali and Ripley 1987) from Central Asia. It can be seen from early November to mid-March in northwestern India, mainly in the desert region of the state. It is distributed in the eleven districts of Rajasthan, but the major concentrations are present in Bikaner, Jodhpur, Barmer and Jaisalmer (Rahmani 1997a). In their winter quarters they are seen in flocks of 3–10 birds. Extensive poaching of this bird has been reported from all over the Thar Desert. Its presence has also been reported from another IBA site of Rajasthan i.e., Sorsan

(Singh 1996). Desert National Park is one of the best places to see Macqueen's Bustard where poaching is under control.

White-browed Bushchat *Saxicola macrorhyncha*
Vulnerable

This small bird is localised in the arid and semi-arid areas of northwest India (Ali and Ripley 1987). Eighty-six individuals on 18 sites were seen during four surveys undertaken by Rahmani (Rahmani 1994, 1997a) in the state. Although it is found in other semi-arid areas, the vast waterless, sandy plains of the Thar Desert serve as the main stronghold of this bird (Rahmani 1997a). This bird is present in six IBA sites of Rajasthan, namely the Desert National Park, Diyatra, Ranthambore National Park, Sonkhaliya, Khichan and Keoladeo National Park.

Pied Tit or White-naped Tit *Parus nuchalis*
Vulnerable

The White-naped Tit is endemic to India and shows discontinuous distribution. The major population is found in northwestern India, particularly in central and south-central Rajasthan, Kutch and northern Gujarat. Another area of its distribution is in southern India, along the Eastern Ghats in Andhra Pradesh, west, central and south Karnataka and northern Tamil Nadu (BirdLife International 2001). In Rajasthan, this bird is found at the juncture of the arid and semi-arid regions of Jodhpur, Nagaur, Jaipur, Ajmer, Pali, Jalore and Sirohi districts due to the availability of scrubland, which is the most preferred habitat of the White-naped Tit. The excessive fragmentation of its habitat intermingled with human settlements, is causing a continuous decline in its population. The survival of this threatened species depends mainly on the conservation of its habitat i.e., Tropical Thorn Forest (Tiwari 2001). Kumbalgarh Wildlife Sanctuary, Sajjangarh Wildlife Sanctuary, Phulwari, Sambar Lake and Sei Dam surroundings, and Udaipur Lake complexes are the IBA sites of the state where the presence of this bird has been recorded. Thanks to the protection of thorn forest, it is now increasingly seen near Jaipur (Manoj Kulshreshtha, *pers. comm.* 2014). It is also seen just outside Udaipur town in the old-growth thorn forest. For more details, see Rahmani (2012).

Green Munia *Amandava formosa*
Vulnerable

According to Ali and Ripley (1987), the Green Munia is very locally and unevenly distributed in Central India from Rajasthan to Odisha. It is a popular cage bird in both domestic and international markets (Ahmed 1997, 1998). Due to this, trapping and trading of the bird is the biggest threat to its population. The species usually prefer scrubland and grasslands, which are fast decreasing due to their conversion into agricultural land. In Rajasthan,



DHRTIMAN MUKHERJEE



DHRTIMAN MUKHERJEE

Wind mills have come out all over Rajasthan, spoiling the landscape and becoming hazard to bird

conversion of the Munia's habitat into mustard fields is a major threat (BirdLife International 2001). Conditions are further deteriorated by habitat fragmentation that is causing the isolation of its population (Ahmed 1998). The severely fragmented population of this bird was observed at several places. Southern Rajasthan, especially Mount Abu,



White-browed Bushchat *Saxicola macrhyngchus* is near endemic bird of India. Nothing is known about its ecology and movement. Even its nest has not been described. This bird of arid biotope could be local migratory

is an important site, holding significant numbers of this vulnerable species (BirdLife International 2001). Mount Abu Wildlife Sanctuary, Sei Dam (vicinity area) and Kumbalgarh Wildlife Sanctuaries are the sites where the Green Munia has been observed.

Demoiselle Crane *Grus virgo* (Congregatory)

The Demoiselle Crane is an important winter migrant of Rajasthan. Thousands of these birds are seen at Khichan and Talchapar Wildlife Sanctuary (Rahmani 1997a, 1997b). In Khichan (near Phalodi), between 5,000 and 7,000 birds are regularly sighted in winter. These birds are also present at many other desert sites such as the vicinity of the Sambar Lake, but the number is low as compared to the former two sites (Rahmani 1997a, 1997b). They are also seen in many wetlands in Diyatra area of Bikaner.

Biomes

According to the geographical distribution of biomes (BirdLife International, undated), Rajasthan mainly falls in two biomes, namely Biome11 (Indo-Malayan Tropical Dry Zone) and Biome13 (Saharo-Sindian Desert) although part of the state (northeastern) also lies in Biome12 (Indo-Gangetic Plains). Thus, the geographical distribution of three biomes can be observed in the state. Of the total 32

IBAs, nine sites were identified based on biome criteria. One IBA site, Keoladeo National Park, represents Biome12 and three sites, namely Desert National Park, Diyatra and Talchapar Wildlife Sanctuary, represent Biome13. The six sites which mainly hold significant populations of biome-restricted assemblages are Kumbalgarh Wildlife Sanctuary, Phulwari-ki-Nal Wildlife Sanctuary, Ranthambore National Park, Sajjangarh Wildlife Sanctuary, Sariska National Park and Sitamata Wildlife Sanctuary. The list of birds of biomes is too long to be mentioned here.

THREATS AND CONSERVATION ISSUES

Indira Gandhi Canal: As expected, Indira Gandhi Canal is having major ecological impact on the Thar Desert. Rahmani (1997a, 1997b, 1997d) has predicted various changes such as expansion of agriculture, road development, spread of new species, plantation of exotic species and spread of invasive species. Owing to improved irrigation facilities, the northern part of the Thar Desert in Haryana and Punjab, and in the Ganganagar district of Rajasthan, is now more or less converted into rich cropland. The same type of habitat alteration was expected in the command area in Jodhpur and Jaisalmer but due to lack of water and soil condition, agriculture has expanded but not to that extent as seen in Ganganagar and parts of Bikaner. Perhaps, other



DHRTIMAN MUKHERJEE

Limited and sustainable harvest of grass and scrub for local consumption is fine but commercial harvest should be at once stopped



DHRTIMAN MUKHERJEE

People living in isolated settlements, locally called dhanis, still largely depend on firewood for cooking food

development activities such as spread of wind mill farms, network of roads, all-terrain vehicles, mushrooming of hotels, and poaching by vehicle-borne criminals is now playing major havoc with desert wildlife. This is a topic for investigation.

Desert National Park: Wrong conservation policies have antagonised local communities living inside the Park, as a result of which there is great resentment against the Park. Bustard breeding areas, called enclosure, are either totally protected resulting in excessive growth of vegetation, or under protected resulting in over-grazing. The authorities have not developed any legislative and social mechanism that benefits local communities and wildlife. As a result of which the population of the Great Indian Bustard has plummeted to less than 50 individuals in the whole Park.

Mining: Rajasthan has the second largest mineral reserves in the country. It produces 42 varieties of major minerals and 23 varieties of minor minerals (Mohnot *et al.* 1987). Marble mining is the most prominent activity in the state. This could be a major irreversible threat to many sites, altering the habitat structure and disturbing the natural characteristics of IBA sites.

Population pressure: The present population density (165 persons per sq. km as per 2001 census) of the state is an increase of 36 persons per sq. km since the 1991 census. This increase has enhanced urbanisation which in turn has caused alteration of pasture and fallow land into human habitation. The Thar Desert is one of the most densely populated deserts in the world, with a human population density of 85 people per sq. km.

Livestock grazing: Extensive over-grazing by livestock all over the Thar desert, and also in protected areas, is one of the biggest problems of Rajasthan. Due to various development projects and increase in human and livestock populations, nomadic patterns of grazing have been disrupted. In the arid Thar desert, which used to have extensive grasslands, surface water as a limiting factor, both temporarily and spatially, no longer works to limit the number of livestock as it is now easily available from the Indira Gandhi Canal. As there is no limit to water availability, now we see abnormally high populations of livestock all over the Thar desert, resulting in severe over-grazing.

Poaching: With large-scale colonisation of the Thar desert due to IGNP, during the last ten years, poaching has become quite common. The numbers of the Great Indian Bustard, Macqueen's Bustard and Chinkara have decreased everywhere including in the DNP. Poaching in other parts of Rajasthan, especially in the Aravalli Hills is also quite common.

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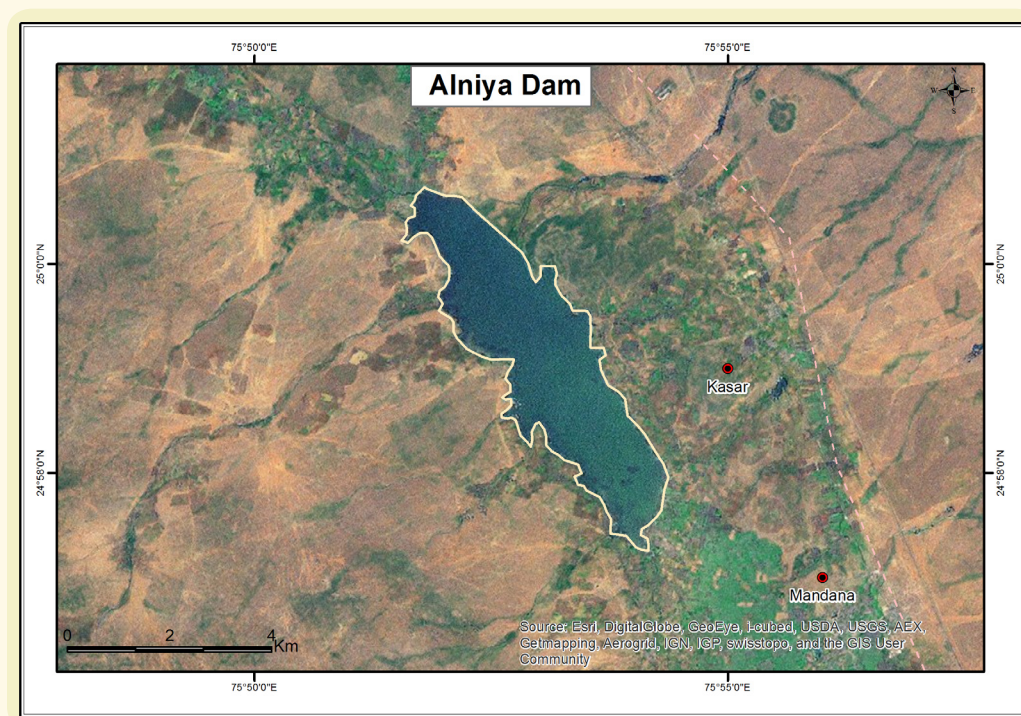
ALNIYA DAM

IN-RJ-01

IBA Site Code	: IN-RJ-01	Area	: 20,143 ha (Catchment Area)
State	: Rajasthan	Altitude	: 260 m
District	: Kota	Rainfall	: 600 mm
Coordinates	: 25° 00' 00" N, 75° 52' 00" E	Temperature	: 1 °C to 43 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Reservoir

IBA CRITERIA: A1 (Threatened species), A4iii (≥ 20,000 waterbirds)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

Alniya is an irrigation tank that supports agriculture in the surrounding areas through minor and major canals. A few pairs of Sarus Crane use the habitat around the lake for breeding. In February 2002, Manoj Kulshreshtha (*pers. comm.*) found 20–21,000 waterfowl in the lake, and 16 pairs of Sarus Crane *Grus antigone* raising their chicks. Due to scanty rainfall in 2002, this lake was affected and reduced to one-fourth of its total capacity. With normal rainfall and consequently normal waterspread, there could be 30,000 waterbirds here. This is identified as an IBA on the basis of the large number of waterfowl that gather in this wetland in winter. The years from 2003 to 2008 experienced scanty rainfall and the water from the dam was used up for irrigation by December, leaving the dam almost empty after that. Large scale fishing and disturbance caused by

contractors has resulted in less than 2,000 birds at the peak of the season. One or two pairs of Sarus Crane breed in the surrounding marshes now and two pairs of Egyptian Vulture were seen breeding in the area.

No proper floral study has been conducted in this wetland. Common plants found in the waterbody were *Ceratophyllum muricatum*, *Eichhornia crassipes*, *Ipomoea aquatica*, *Lemna aequinoctialis*, *Phragmites karka*, *Polygonum glabrum*, *Potamogeton pectinatus*, and *Vallisneria spiralis*.

Alniya Dam used to qualify three Ramsar criteria: 2 (wetland supports threatened ecological communities), 5 (wetland regularly supports 20,000 or more waterbirds), and 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). Except for the criterion- 5 which the site may not qualify anymore due to disturbances in recent years, the other two criteria are still

valid. Alniya Dam comes under Ramsar Wetland Type 6 (water storage area) (Islam and Rahmani 2008).

AVIFAUNA

Among the threatened species listed in the Red Data Book (BirdLife International 2014), the Sarus Crane *Grus antigone* is a regular breeding species at the lake. Another globally threatened species recorded is the Indian Skimmer *Rynchops albicollis*. Seven Indian Skimmers were recorded in May 1989 by Vyas (1990) and one in July 1989 by Sangha & Kulshreshtha (1998). Alniya is close to the National Chambal Sanctuary (another IBA) where the Indian Skimmer breeds regularly, so these birds are likely to be arriving from there.

Dalmatian Pelican *Pelecanus crispus*, classified as Vulnerable by BirdLife International, is regularly seen at Alniya Dam (Vyas 1993). The Great White Pelican *P. onocrotalus* is also seen here.

Near Threatened species recorded were Oriental Darter *Anhinga melanogaster*, Painted Stork *Mycteria leucocephala*, and Black-necked Stork *Ephippiorhynchus asiaticus* (Vyas 1990, 1993). Vyas has seen up to seven individuals of Black-necked Stork in January 1990

CRITICALLY ENDANGERED

Red-headed Vulture *Aegypius calvus*

ENDANGERED

Egyptian Vulture *Neophron percnopterus*

Black-bellied Tern *Sterna acuticauda*

VULNERABLE

Dalmatian Pelican *Pelecanus crispus*

Sarus Crane *Grus antigone*

Asian Woollyneck *Ciconia episcopus*

Indian Skimmer *Rynchops albicollis*

Eastern Imperial Eagle *Aquila heliaca*

NEAR THREATENED

Oriental Darter *Anhinga melanogaster*

Eurasian Curlew *Numenius arquata*

Painted Stork *Mycteria leucocephala*

Black-necked Stork *Ephippiorhynchus asiaticus*

Black-headed Ibis *Threskiornis melanocephalus*

Ferruginous Duck *Aythya nyroca*

River Tern *Sterna aurantia*

Black-tailed Godwit *Limosa limosa*

Great Thick-knee *Esacus recurvirostris*

Alexandrine Parakeet *Psittacula eupatria*



Sarus Crane *Grus antigone* regularly breeds in and around Alniya Dam

when the water of Alniya Dam was partially drained for irrigation and a large shallow zone was created where fish, frogs, and crustaceans were trapped. Other interesting records from this site are White Stork *Ciconia ciconia* and Black Stork *Ciconia nigra*, both winter migrants to India.

Species like Black Stork, Black-necked Stork, White Stork, Indian Skimmer, Common Shelduck, and Oriental Darter have not been seen in the last few years. Though the numbers of birds have declined drastically due to large scale disturbance, the dam and its surrounding area still support enough Red Data species (listed below) to justify its inclusion in the IBA category.

Earlier vultures were very common in the vicinity of Alniya Dam but now they are almost gone. While the Egyptian Vulture *Neophron percnopterus* is fairly common in the area, particularly around villages, there are occasional records of Red-headed Vulture *Aegypius calvus*. The two Gyps species of vultures, White-rumped *G. bengalensis* and Long-billed *G. indicus* are almost gone.

It is likely that many waterbird species were present in Alniya Dam above their 1% global threshold levels determined by Wetlands International (2012). This site has been selected as an IBA based on the presence of a breeding population of the globally threatened Sarus Crane (A1 criteria) and presence of more than 20,000 waterbirds (A4iii criteria). Unfortunately, this does not hold true now as the dam gets only 2,000–5,000 birds (Himmat Singh pers. obs. 2014).

OTHER KEY FAUNA

Eleven species of commercially valuable fish including *Amblypharyngodon mola*, *Catla catla*, *Channa marulius*, *Cirrhinus mrigala*, *Cyprinus carpio* var. *communis*, *Puntius sarana*, and *P. ticto* were recorded from the reservoir. Jungle Cat *Felis chaus*, Golden Jackal *Canis aureus*, Nilgai *Boselaphus tragocamelus*, and Chinkara *Gozella bennettii*, have been recorded from the area.

LAND USE

- Irrigation
- Fishing
- Agriculture

THREATS AND CONSERVATION ISSUES

- Agriculture
- Pesticides
- Encroachment
- Eutrophication

This wetland is commonly used for agriculture, irrigation, fishing, drinking and wallowing by cattle, and clay gathering. Agricultural practices were seen in the dried up area of lake. Over-use of water for agriculture, use of pesticides, encroachment of the lake by local villagers, reduction in water level, and eutrophication are the major conservation issues.

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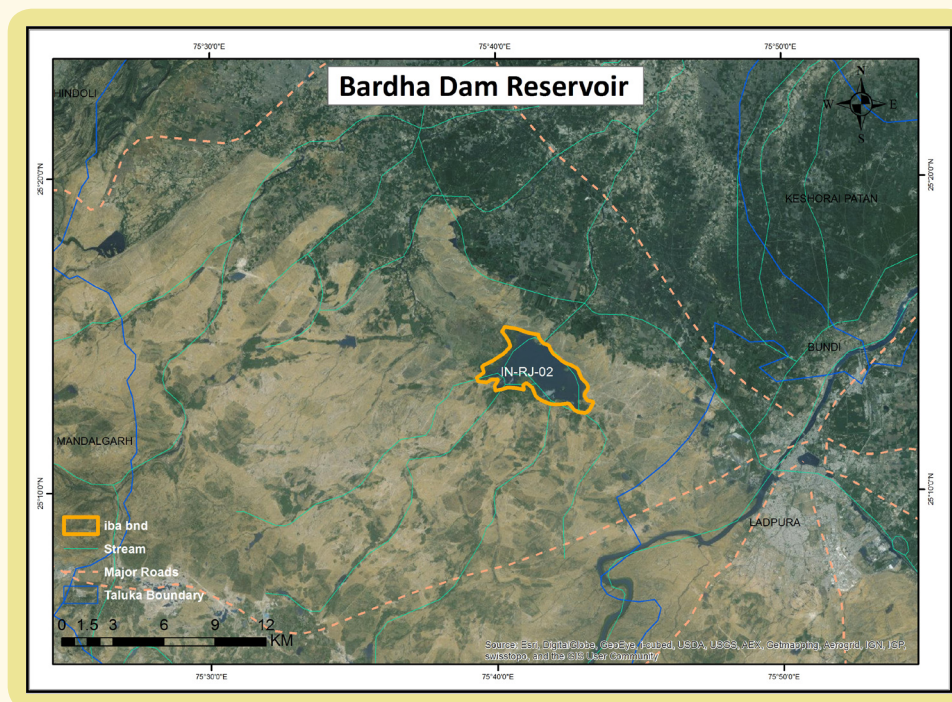
Manoj Kulshreshtha, Harkirat Singh Sangha, Rakesh Vyas.

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IBA Site Code :	IN-RJ-02	Area	: 300 ha
State	: Rajasthan	Altitude	: 390 m
District	: Bundi	Rainfall	: 7,000 mm
Coordinates	: 25° 26' 60" N, 75° 39' 00" E	Temperature	: 8 °C to 45 °C
Ownership	: State (Irrigation Department)	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Reservoir

PROTECTION STATUS: Not officially protected.



Bardha Dam is a medium sized irrigation dam, with an expanse of c. 300 ha. It is situated 20 km east of the district headquarters of Bundi. The wetland supports a large number of waterfowl, particularly migratory ducks, pelicans, flamingos, Eurasian Spoonbill *Platalea leucorodia*, Ruff *Philomachus pugnax*, Gadwall *Anas strepera*, Bar-headed Goose *Anser indicus*, and other waterbirds. The reservoir is controlled by the State Irrigation Department, as its main purpose is to supply water to farmers. Bardha Dam was proposed as a potential Ramsar Site in India as it meets the Ramsar Criteria and for its high ecological values (Islam & Rahmani 2008). It qualifies Ramsar Criterion 2 (wetland supports threatened ecological communities) and Criterion 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). Under the Ramsar Wetland Type, Bardha Dam is considered as type 6 (water storage area).

The reservoir hosts White Pelican *Pelecanus onocrotalus* (250: 1% of South Asian population is 210), Gadwall *Anas strepera* (5,000: 1% South Asia population is 3,000), Eurasian Spoonbill (200: 1% of South Asian population is 230), Ruff *Philomachus pugnax* (2,000: 1% of South Asian population is 1,000), Sarus Crane *Grus antigone* (100: 1% of South Asian population is 90) whose presence justifies its inclusion as an IBA site (Wetlands International 2012). Besides, it also fulfills criteria A1 and A3. Over 10,000 aquatic birds of approximately 30 species have been recorded from the reservoir. Bardha Dam also holds significant numbers of Dalmatian Pelican *Pelecanus crispus* (100-200), Knob-billed or Comb Duck *Sarkidiornis melanotos* (up to 100 in some years), and Bar-headed Goose *Anser indicus* (around 300).

Biome-restricted species of special conservation concern are Red-naped or Black Ibis *Pseudibis papillosa*, White-rumped Vulture *Gyps bengalensis* (now very rare).



MANISH ARYA

Bardha Dam attracts thousands of waterfowl including significant number of Dalmatian Pelican *Pelecanus crispus*

Indian Peafowl *Pavo cristatus*, Indian Courser *Cursorius coromandelicus*, and Yellow-legged Green-Pigeon *Treron phoenicopterus*.

OTHER KEY FAUNA

Important fauna other than birds are Golden Jackal *Canis aureus*, Indian Fox *Vulpes bengalensis*, Bengal Monitor

Varanus bengalensis, and Chinkara *Gazella bennettii*.

LAND USE

- Agriculture
- Fishing

THREATS AND CONSERVATION ISSUES

- Fall in water level
- Over-exploitation of fish resources
- Excessive human interference
- Insecticide use in crop fields
- Siltation

The water of this irrigation reservoir is drained through canals from the dam for agricultural purposes. This restricts the habitat of waterfowl but also creates shallow areas which attract some waders. Fishing, perhaps, is the major disturbance factor, but not much can be done about it as the Irrigation Department auctions the fishing rights every year. It would greatly benefit bird conservation if fishing is restricted or even stopped for a few months in winter when migratory birds are present. Although the area does not belong to the Forest Department, the waterfowl are their responsibility. The Forest, Irrigation, and Fisheries departments, in order to benefit farmers, fishermen and birds alike, could draw up a joint management plan.

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Rakesh Vyas, R.S. Tomar, Himmat Singh, Krishnendra Singh Nama, Hari Mohan Meena, Jatinder Kaur, Manoj Kulshreshtha.

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CRITICALLY ENDANGERED

White-rumped Vulture (very rare)	<i>Gyps bengalensis</i>
Red-headed Vulture (very rare)	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>

VULNERABLE

Sarus Crane	<i>Grus antigone</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Dalmatian Pelican	<i>Pelecanus crispus</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Eurasian Curlew	<i>Numenius arquata</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
River Tern	<i>Sterna aurantia</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Great Thick-knee	<i>Esacus recurvirostris</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-naped or Black Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Indian Peafowl	<i>Pavo cristatus</i>
Indian Courser	<i>Cursorius coromandelicus</i>
Yellow-footed Green-Pigeon	<i>Treron phoenicopterus</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Common Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrocus birostris</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Jungle Babbler	<i>Turdoides striatus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>

DESERT NATIONAL PARK

IN-RJ-03

IBA Site	: IN-RJ-3	Altitude	: 242 msl
State	: Rajasthan	Rainfall	: 150 mm
District	: Jaisalmer, Barmer	Temperature	: 2 °C to 50 °C
Coordinates	: 26° 34' 41" N, 70° 45' 01" E	Biogeographic Zone	: Desert
Ownership	: State	Habitats	: Desert, Thorny Scrub, Grassland
Area	: 316,200 ha		

IBA CRITERIA: A1 (Threatened species), A3 (Biome 13: Saharo-Sindian Desert)

PROTECTION STATUS: Desert National Park (Wildlife Sanctuary), established in 1992.



GENERAL DESCRIPTION

In order to protect the fauna and flora of the Thar Desert, the Government of India in the late 1970s started planning the establishment of a large protected area where human pressure could be minimized and maximum protection to wildlife from hunters and habitat alteration provided. The Desert Wildlife Sanctuary (popularly called Desert National Park) was the result of this planning. It is one of the three protected areas of Thar Desert (Rahmani 1997). It was notified in 1984 and was proposed to be gradually upgraded to a National Park, hence, it is popularly called the Desert National Park (DNP). One of the main purposes of establishing this national park was to protect the now Critically Endangered Great Indian Bustard *Ardeotis nigriceps*.

The major objective of DNP was to develop core areas (enclosures) in which human interference could be

minimized and livestock grazing banned. In the initial stages, Sam, Sudasari, Phulia, and Miyajlar enclosures were established. The Forest Department continues to add new enclosures. Presently, there are 28 enclosures, with Chowani and Gajaimata being the most recent additions. Besides the enclosures within the park, there are six enclosures outside the boundary, which are termed satellite conservation areas, the most significant of which are Ramdeora and Rasla (Rahmani 1989, 1997; Dutta *et al.* 2014).

AVIFAUNA

This IBA is perhaps the most important site for the long-term survival of the globally threatened Great Indian Bustard. In the 1980s, there could have been c. 200–400 Great Indian Bustards in and around this sprawling park. But now, the numbers have reduced and are likely to be



DHIRTIMAN MUKHERJEE

The Desert National Park protects the finest desert eco-system in India. Unfortunately this unique eco-system has not been given as much attention as it deserves

around 150 birds (density of 6/1000 sq. km) in the Desert National Park and adjoining agro-grass landscapes of Jaisalmer and Jodhpur districts (Dutta *et al.* 2014). This population occurs in two major pockets – one in Sudasari and adjoining areas of Sam, Salkha, Kanoi, Gajaimata, and Chowani, and another in Ramdeora and army occupied Pokhran grassland (Dutta *et al.* 2014).

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Great Indian Bustard	<i>Ardeotis nigriceps</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Greater Spotted Eagle	<i>Aquila clanga</i>
Stoliczka's Bushchat	<i>Saxicola macrorhyncha</i>
Macqueen's Bustard	<i>Chlamydotis macqueeni</i>

NEAR THREATENED

Cinereous Vulture	<i>Aegypius monachus</i>
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BIOME 13: SAHARO-SINDIAN DESERT

Spotted Sandgrouse	<i>Pterocles senegallus</i>
Sykes' Nightjar	<i>Caprimulgus mahrattensis</i>
Desert Finch-lark	<i>Ammomanes deserti</i>
Greater Hoopoe-lark	<i>Alaemon alaudipes</i>
White-eared Bulbul	<i>Pycnonotus leucotis</i>
Trumpeter Finch	<i>Bucanetes githagineus</i>

The bustard still breeds in many parts of the park, especially in Sudasari, Sam, and Ramdeora enclosures. Even now, if hunting and habitat degradation (livestock overgrazing, population increase of nest/chick predators like dogs, foxes and wild pigs) are reduced, the number of bustards will possibly increase.

Among other threatened species, the most notable is Macqueen's Bustard *Chlamydotis macqueeni* which is now listed as Vulnerable. Although population estimates for DNP are difficult to make, Rahmani (1998) estimated a crude density of 0.31 birds per sq. km overall in the Thar Desert, based on actual sightings and 1.05 birds per sq. km based on sightings and tracks. This bustard is regularly found in small groups of three to five birds in winter (November to February) in Sudasari, Sam, Chowani, and Gajaimata enclosures (S. Dutta *pers. obs.*).

There has been a drastic decline in bird species such as the *Gyps* vultures, which are still seen here, although not in their former numbers. This IBA supports six species of vultures that mostly depend on large livestock (cattle and camel) carcasses around settlements. The Critically Endangered Red-headed or King Vulture *Aegypius calvus* is widespread but generally seen solitarily or in flocks of two to three birds. Two nests were found in February near Sudasari (Rahmani 1997). The Cinereous Vulture *Aegypius monachus* is widespread in winter, along with the Eurasian Griffon *Gyps fulvus* and other species of vultures. This site is also important for the



NIRAV PAREKH

Critically endangered Great Indian Bustard *Ardeotis nigriceps* is the iconic species of the Desert National Park. For its survival, it deserves special protective measures based on scientific research, and involvement of local communities. Probably 50–60 bustards are surviving in the Desert National Park and the surrounding areas

Vulnerable White-browed (Stoliczka's) Bushchat *Saxicola macrorhynchus*, which has been seen in Sudasari, Sam, and Nimba areas of DNP (Rahmani 1996a). There are stray records of Green Munia *Amandava formosa* (Rahmani 1996b).

The DNP holds the typical desert flora and fauna of the Indian Thar Desert, which is part of the much larger Saharo-Sindian Desert. BirdLife International (undated) has identified it as Biome 13 and listed 11 bird species. Besides the Great Indian Bustard and Stoliczka's Bushchat, six more species of Biome 13 have been found in DNP. The Greater Hoopoe-lark *Alaemon alaudipes* probably breeds here, as its display was seen just outside the park in July (Rahmani 1997). Another interesting bird which breeds here is the Cream-coloured Courser *Cursorius cursor* (Rahmani & Manakadan 1989). For both these species, the Thar is the easternmost limit of their wide distribution from Morocco in North Africa to the whole of the Middle East, and then Iran to India.

OTHER KEY FAUNA

Among the large mammals, Chinkara *Gazella bennettii* is the most common, presently at a density of 3.8 individuals/sq. km (Dutta *et al.* 2014). Due to the development of the Indira Gandhi Nahar Project (IGNP) and increase in irrigation fields, Blue Bull *Boselaphus tragocamelus* is increasingly sighted alongside Wild Pig *Sus scrofa* in some

areas. Golden Jackal *Canis aureus*, Desert Fox *Vulpes vulpes pusilla*, and in some areas Indian Fox *Vulpes bengalensis*, are the major natural predators. The Indian Desert Cat *Felis silvestris* is also found but difficult to sight. Desert Hare *Lepus nigricollis dayanus*, a subspecies of the Black-naped Hare, and the Long-eared Hedgehog *Hemiechinus auritus* are among the smaller denizens of the park.

The Desert Skink *Ophiomorus tridactylus*, known as Sandfish as it 'swims' or burrows through sand down to a depth of 30 cm, is found here. There are more than 43 species of reptiles, including the Spiny-tailed Lizard *Saara hardwickii*, Russell's Viper *Daboia russelii*, Saw-scaled Viper *Echis carinatus*, and the Bengal Monitor *Varanus bengalensis*.

LAND USE

- Nature conservation and research
- Tourism and recreation
- ONGC oil exploration
- Wind power generation
- Livestock herding
- Dry farming, including uncontrolled cultivation of Guar *Cyamopsis tetragonoloba* which is used to prepare industrial gum
- Human habitation
- Canal irrigation

THREATS AND CONSERVATION ISSUES

- Hunting prevalent in many areas except those dominated by Bishnoi communities
- Bustard hunting prevalent in neighbouring Cholistan in Pakistan – these birds are likely to be seasonal migrants from the Thar population
- Overgrazing by domestic livestock, a major cause of habitat deterioration
- Large expanse of DNP, makes implementation of protective measures difficult
- Increasing threats from stray dogs to GIB nest/chicks, Chinkara, and other wildlife.
- Water provisioning inside enclosures benefits species that are not xerophytes, such as the Indian Fox and Wild Pig, in turn increasing nest predation on GIB and other ground-birds.
- Farming of Guar *Cyamopsis tetragonoloba*, a source of industrial gum, which loosens the fixed soil of the cropped area and changes land type
- Proposed construction of irrigation canal (along Gadra Road Canal through DNP), may increase agricultural pressure and change cropping

patterns into more intensive and inorganic forms which are detrimental to wildlife.

- Uncontrolled and sometimes illegal tourism in some areas (e.g., tourist resorts near Sam)
- Proposed oil exploration by ONGC
- Encroachment by villagers on revenue lands for cultivation, and perhaps for acquiring and selling these lands to upcoming industrial projects.
- Lack of local support for conservation, as legitimate rights of villagers have not been settled during notification of DNP, and its large expanse restricts development activities in/around villages.

Even 20 years after the establishment of Desert National Park, only preliminary notification has been done. Final notification, which will take into account the rights of local people, has not been done. This has to be done by the District Collector, on the recommendations of the Director of the park. Earlier, 33 villages of Jaisalmer and 52 villages of Barmer district were inside the DNP area. Between 1980 and 1994, at least 20 new villages have come up. In reality, *dhanis* (small settlements of a few pastoralist households) have been notified as villages due to increase in human population, and



ASAD R. RAHMANI

Due to the wrong policies of management of the land, the local people who own most of the land of the park are extremely upset. Without the support of local communities there is no future of the Desert National Park

also to get government aid, to which only notified villages are entitled. Human population has increased to 100,000 in 86 villages and cattle population is c. 332,750. Villagers need more grazing land, thus they are not allowing new enclosures to be developed, and are letting their cattle graze inside the existing enclosure. Earlier, the fencing around enclosures was not sufficient to exclude livestock. This is now being replaced by chain-link fence that has minimized, although not fully eliminated the disturbances inside enclosures. Proposal to make these fences predator-proof by additional measures is under consideration.

There is conflict over resource sharing between the Forest Department and the villagers. Ecology and Rural Society is trying to educate villagers to take advantage of ecotourism which can be an alternative source of income.

The second greatest danger to this site is the plan to develop Gadra Road irrigation canal, a tributary of the Indira Gandhi Nahar Project (IGNP) (Rahmani 1989, 1997). This canal, if developed, will bisect the park, and also bring in settlers, as in other parts of the desert. Water could instead be supplied to the villagers through underground pipes, avoiding wide, open canals.

Recently, the Oil and Natural Gas Commission (ONGC) has approached the DNP authorities to allow preliminary oil exploration in the heart of the IBA. Despite opposition from conservationists, the Ministry of Environment and Forests, Government of India, has given permission to ONGC to drill inside DNP.

Wind turbines are a source of renewable energy, but the power transmission lines have criss-crossed IBA lands, presenting fatal collision risks of large birds like the Great Indian Bustard. In order to devise a scientific management plan, it is necessary to intensively study the ecology, movement, and habitat requirements of the Great Indian Bustard through modern techniques such as satellite tracking and radio telemetry.

A recent study by Dutta *et al.* (2014) shows that 75% of priority conservation area in the Thar landscape falls outside the park boundary. To account for this, as well as to reduce public antagonism towards conservation, a proposal

to rationalize the park boundary is under consideration that entails conservation of a smaller area (400 sq. km), denotification of the remaining park (3,000 sq. km), and compensatory notification of sanctuary and conservation reserves in other priority sites within the Thar landscape.

The National Bustard Recovery Plan guidelines have recommended: (a) developing disturbance-free spaces for GIB by consolidating existing enclosures and creating new ones in areas intensively used by the species; (b) curtailing infrastructural development such as irrigation canal and overhead powerlines within 5 km radius of each enclosure; and (c) making the larger landscape less hostile for birds by reducing public antagonism through a combination of awareness campaigns and addressing livelihood issues.

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DIYATRA AREA

IN-RJ-04

IBA Site Code : IN-RJ-04

State : Rajasthan

District : Bikaner

Coordinates : 27° 40' 00" N, 72° 55' 00" E

Ownership : Revenue Department

Area : 5,019 ha

Altitude : 235 msl

Rainfall : 200–300 mm

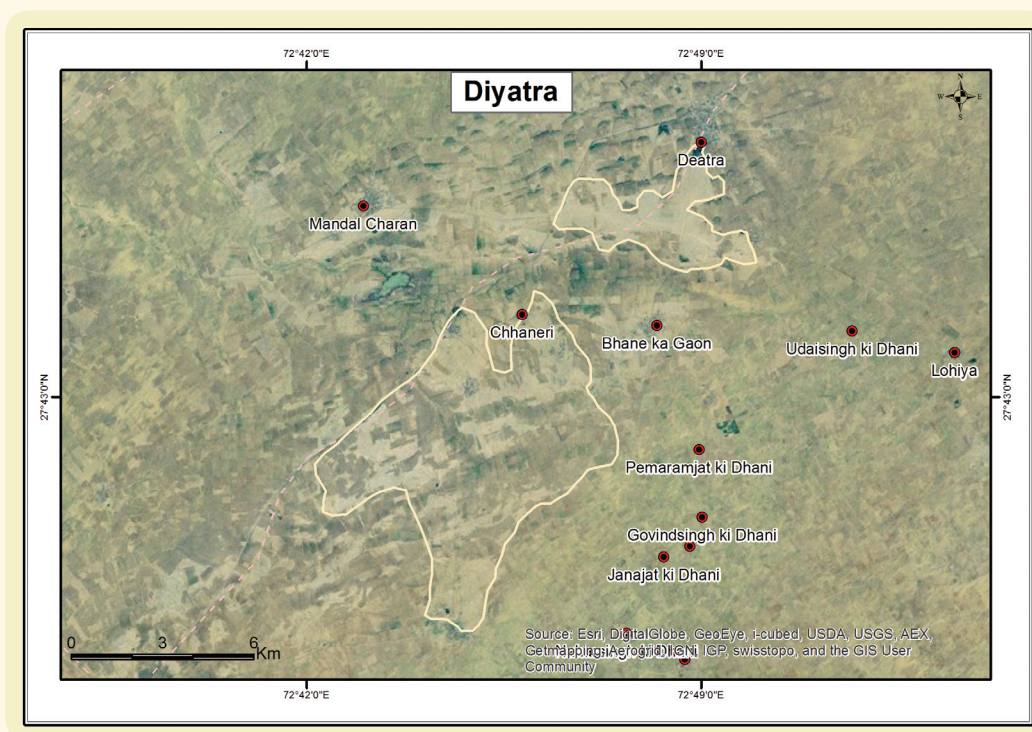
Temperature : 2 °C to 50 °C

Biogeographic Zone : Desert

Habitats : Desert, Thorny Scrub,
Low Grassland

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

Diyatra is one of the threatened IBAs of India as the Great Indian Bustard *Ardeotis nigricaps*, on the basis of which this site was selected (A1: Threatened species), has almost disappeared due to hunting, expansion of agriculture, and neglect of the site by the Forest Department. At one time, it was declared as a Closed Area, but since the closed areas concept was replaced by the Community Reserve and Conservation Reserve concept in the Indian Wildlife (Protection) Act, it neither remained a Closed Area nor was it designated as a Community/Conservation Reserve. Even when it was a Closed Area, for almost 25 years, no attempt was made to manage it. The site used to be the hunting reserve of the Maharaja of Bikaner for Great Indian Bustard. The site is situated c. 65 km southwest of Bikaner along the national highway to Jaisalmer. Various departments of the Rajasthan Government have established

pasture enclosures during various periods of time, but most of them are neglected and overrun by livestock. If properly protected, these grassland enclosures would have provided undisturbed breeding areas for the Great Indian Bustard. These enclosures are now mainly used by Chinkara *Gazella bennettii* and Nilgai *Boselaphus tragocamelus*, and rarely by the Great Indian Bustard.

Important flora of Diyatra consists of *Ziziphus rotundifolia*, *Capparis decidua*, *Calotropis procera*, *Prosopis cineraria*, *Calligonum* sp., *Leptodenia pyrotechnica*, and the grass *Cenchrus biflorus* (Satish K. Sharma, pers. comm. 2003). The sandy zone, having low grasslands and scrub vegetation is dominated by *Ziziphus rotundifolia* and *Capparis decidua*.

AVIFAUNA

Besides the Great Indian Bustard, Diyatra Closed

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Great Indian Bustard	<i>Ardeotis nigriceps</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

White-browed Bushchat	<i>Saxicola macrorhyncha</i>
Macqueen's Bustard	<i>Chlamydotis macqueeni</i>

NEAR THREATENED

Cinereous Vulture	<i>Aegypius monachus</i>
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Area is a regular wintering ground of the Macqueen's Bustard *Chlamydotis macqueeni*. It is also one of the major strongholds of White-browed or Stoliczka's Bushchat *Saxicola macrorhyncha*. During a survey in 1994, 36 birds were sighted in one day in Diyatra area, especially near Hadda, Tokla, and Niagaon (Rahmani 1996). However, during a survey in September, 2013, no White-browed Bushchat was seen (Himmat Singh, *in litt.* 2014).

The Great Indian Bustard has become extremely rare. During a two-day survey in January, 2014 (Rahmani *et al.* 2014), no bustard was sighted, although the local people said that a few birds are sometimes seen.

Till the early 1990s, White-rumped *Gyps bengalensis* and Long-billed *G. indicus* Vultures were extremely common, and it was not unusual to see 250–300 on a cattle carcass. Now they have almost disappeared. However, Griffon

Vulture *Gyps fulvus* is still seen in good numbers, with an occasional Himalayan Vulture *G. himalayensis*. The Endangered Egyptian Vulture *Neophron percnopterus* has also become uncommon, but is still seen solitarily or in small groups around villages. The Near Threatened Cinereous Vulture *Aegypius monachus* is frequently seen, along with other vultures. All these vultures are also sighted in Jor Beed near Bikaner, which is listed as a new IBA. Jor Beed is about 75 km from Diyatra.

Earlier, a lake near Diyatra village used to be an important watering spot for the Imperial or Black-bellied Sandgrouse *Pterocles orientalis*. The Maharaja of Bikaner had built a hunting lodge beside the lake. This rainfed shallow lake is still present, but the number of Imperial Sandgrouse has drastically decreased, some may have moved away as they get water in many other places due to irrigation by the Indira Gandhi Nahar Project (Rahmani 1997). During survey in January, 2014, no Imperial Sandgrouse was seen.

The site falls in Biome 13 (Saharo-Sindian Desert). Sharma (1986) was the first to report breeding of the Cream-coloured Courser *Cursorius cursor* within Indian limits, from Diyatra region when he saw small chicks in February. Later, this species was found breeding in the Desert National Park (an IBA) (Rahmani & Manakadan 1989).

In winter, vast flocks of Bimaculated Lark *Melanocorypha bimaculata*, Greater Short-toed Lark *Calandrella brachydactyla*, Lesser Short-toed Lark *C. rufescens*, and some Hume's Short-toed Lark *C. acutirostris* are seen. In the extant grasslands, Short-eared Owl *Asio flammeus* are often



DHIRTIMAN MUKHERJEE

Upto 1980s Diyatra Closed Area was one of the important strongholds of the the Great Indian Bustard *Ardeotis nigriceps*. It was also the shooting reserve of the erstwhile Maharaja of Bikaner. Due to the complete neglect by the forest department and intensification of agriculture, not more than 5-6 Bustards are left in this area

seen, sometimes 15–20 roosting within a few square metres.

OTHER KEY FAUNA

Other fauna of Diyatra includes Chinkara *Gazella bennettii*, Red Fox *Vulpes vulpes*, Desert Monitor *Varanus griseus*, and Spiny-tailed Lizard *Uromastyx hardwickii*. Nilgai or Blue Bull *Boselaphus tragocamelus* and Wild Boar *Sus scrofa*, which were not present earlier, are now increasingly seen, due to availability of water and irrigation facilities from the Indira Gandhi Nahar Project.

LAND USE

- Agriculture
- Grazing

THREATS AND CONSERVATION ISSUES

- Poaching
- Agricultural expansion
- Grazing
- Wind mills

Due to the increase in the number of settlements and villages around the site, the area of Diyatra is being brought under cultivation, resulting in disturbance to the Great Indian Bustard, Macqueen's Bustard, White-browed Bushchat, and other birds. Fallow land is decreasing and *Capparis* bushes are being uprooted to clear the ground for human activities.

Since declaring Diyatra as a Closed Area for shooting, the Forest Department seems to have forgotten its existence! There is practically no patrolling. Sometimes, a forest guard is officially posted there, but they rarely visit the area, as a result of which poaching is quite common. Hunters mainly come in search of Macqueen's Bustard and Imperial Sandgrouse, but kill Great Indian Bustard when they come across one. Hunting was observed in 1986 (Rahmani 1986). During surveys in 1993–94, and in 1998 and 2000, much evidence, including bustard feathers and jeep tracks, and reports of local people, indicated that illegal hunting was still quite common. The best indication of poaching is the dramatic decrease in bustard numbers over the last 30 years of monitoring this site.



While the Great Indian Bustard *Ardeotis nigriceps* has almost disappeared, the Chinkara *Gazella bennettii* is doing well thanks to the protection provided by the Bishnoi community

DHRTIMAN MUKHERJEE

Due to large-scale gypsum factories and sand mining, the area is now highly disturbed. The carcass dumping area of Diyatra village, where White-rumped Vultures were seen, has now been shifted 3 km away from the village towards Bikaner. Habitat alteration and destruction are becoming major threats to the area. Wind mills have come up in and around the area, posing a threat to larger birds like vultures and the Great Indian Bustard.

Other major threats are the expansion of agriculture and overgrazing of livestock. An intensive environmental awareness programme among local villagers can save the Great Indian Bustards of Diyatra.

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Asad R. Rahmani, Himmat Singh

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GAGWANA ARAIN, MANGLIYAWAS, RAMSAR, GOYAL, RATAKOT, AND BANDAR

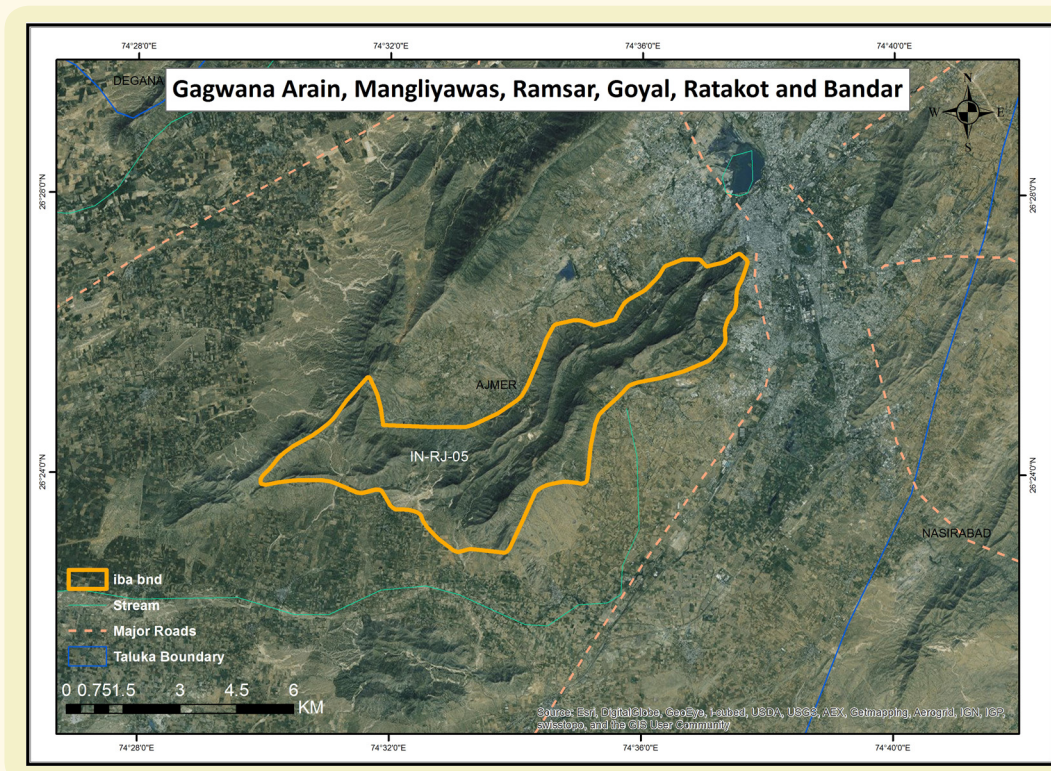
IN-RJ-05

IBA Site Code	: IN-RJ-05
State	: Rajasthan
District	: Ajmer
Coordinates	: 26° 25' 60" N, 74° 37' 00" E
Ownership	: State, Private

Area	: Undefined
Altitude	: 470 m
Rainfall	: 500 m
Temperature	: 2 °C to 45 °C
Biogeographic Zone	: Semi-arid
Habitats	: Scattered Grasslands

IBA CRITERIA : A1 (Threatened species)

PROTECTION STATUS : Not officially protected.



GENERAL DESCRIPTION

This site is a group of several grasslands, situated about 15 km northeast of Ajmer city, adjacent to National Highway No. 8. During a good monsoon, the Lesser Florican *Sypheotides indicus* breeds in some of the better protected grasslands (Sankaran 2000). Most of these grasslands are privately owned and are maintained for fodder production. Owing to human population pressure, legal problems, and growth and division of families, these grasslands are constantly being fragmented and converted to crop fields or put to other use. Killing of floricans by grassland owners is still a problem, but due to intensive publicity by Ravi Sankaran, many owners now protect this endangered bird.

Another species of conservation concern is the Sarus Crane *Grus antigone*, which breeds when rainfall is adequate. Sarus is not hunted at all, as it is considered a sacred bird.

Prosopis juliflora and *Acacia nilotica* are the two dominant woody species, both in private and government lands. Privately protected sites are dominated by grasses, which are harvested from October-November or grazed by small herds of cattle. Common lands are heavily grazed upon throughout the year. No systematic study of the flora has been done.

AVIFAUNA

No detailed study has been undertaken, except for

opportunistic observations made during surveys of the Lesser Florican. Almost all bird species of seasonal semi-arid grasslands, such as larks, warblers, francolins, and quail are seen. This IBA falls at the junction of three biomes, i.e. Biome 11 (Indo-Malayan Tropical Dry Zone), Biome 12 (Indo-Gangetic Plains) and Biome 13 (Saharo-Sindian Desert), therefore some bird species representing these biomes are reported here.

ENDANGERED

Lesser Florican *Sypheotides indicus*

VULNERABLE

Sarus Crane *Grus antigone*

OTHER KEY FAUNA

No large mammal or reptile of conservation concern is found in this site except Nilgai *Boselaphus tragocamelus*.

LAND USE

- Pasture land
- Agriculture
- *Panchayat* (village council) land

THREATS AND CONSERVATION ISSUES

- Poaching
- Encroachment on pasture and riverine land
- Human population pressure
- Habitat loss due to agriculture
- Effect of pesticides
- Construction of National Highway NH-8
- Tree plantation converting the grasslands to plantation area.

The major conservation issue is how to protect these pockets of grassland on a long-term basis. As long as protecting these grasslands is economically favorable, villagers will protect them, but as soon as they find that by converting these grasslands into crop fields or some other use will give them greater benefit, they will do so. Being a fodder deficit state, Rajasthan needs millions of tons of grass to feed its growing population of livestock. However, very few steps have been taken to protect grasslands and harvest them at the right time. There is an urgent need to develop a system that encourages villagers to protect the grasslands during monsoon and harvest them for fodder at the right time. Village level cooperative societies, on the pattern of milk cooperatives, could be developed.

Near Mangaliyawas there is huge pressure from construction activities. Numerous highways and flyovers are being constructed in Rajasthan for the last 10 years. Construction activities are not limited to the highways alone, as the work needs a supply of stones. Many temporary stone quarries, stone crushing factories, and stone storage space are also required, which in



DHIRTIMAN MUKHERJEE

In the 1980s and upto mid-1990s a cluster of grasslands which constituted this IBA had significant number of Lesser Florican *Sypheotides indicus*. But the situation is not very good. Surveys and environmental education to involve local people is urgently required

totality exerts huge pressure on the surrounding area.

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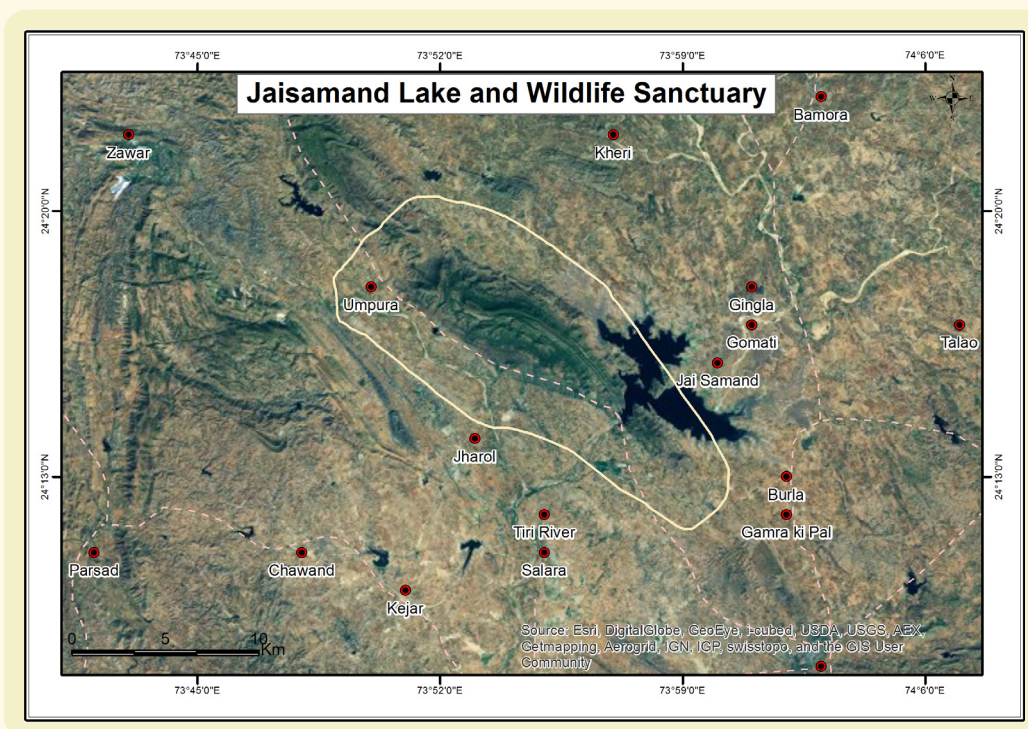
JAISAMAND LAKE AND WILDLIFE SANCTUARY

IN-RJ-06

IBA Site	: IN-RJ-6	Altitude	: 572–697 m
State	: Rajasthan	Rainfall	: 569 mm
District	: Udaipur	Temperature	: 2 °C to 44 °C
Coordinates	: 24° 16' 29" N, 73° 52' 40" E	Biogeographic Zone	: Semi-arid
Ownership	: State	Habitats	: Wetland, Tropical Dry Deciduous Forest
Area	: 7,300 ha (2,100 ha Lake + 5,200 ha Terrestrial)		

IBA CRITERIA: A1 (Threatened species), A4i (1% biogeographic population threshold), A4iii ($\geq 20,000$ waterbirds).

PROTECTION STATUS: Wetland, Wildlife Sanctuary since November 1955.



GENERAL DESCRIPTION

The Jaisamand Wildlife Sanctuary is situated 50 km south of Udaipur, amidst lush green valleys of the Aravalli Hills. The forest of the sanctuary used to be a *shikargah* (Game Reserve) of the erstwhile Maharanas of Mewar. The world famous Jaisamand Lake forms an integral part of the sanctuary. Jaisamand Lake, one of Asia's largest artificial aquatic bodies, was constructed by Maharana Jai Singh of Mewar in the late 17th century (1691 CE) to provide water for the population of Udaipur. The lake now not only serves this purpose, but also provides an ideal habitat for many local and migratory birds. A small waterbody called Dhebar Jheel existed here originally. A wall was constructed across the Aravallis to impound several rivers, converting this waterbody into a huge expanse of water with a span of 14 km at certain places. With a circumference of 88 km, the lake covers an area of 2,100 ha. According to folklore, nine

rivers and 99 rivulets feed Jaisamand. The lake receives water mainly from four rivers, the Gomti, Jhamari, Rooparel, and Bagaar. The tree species of this IBA are representative of Dry Deciduous forests, and scrub forests such as *Acacia leucophloea*, *A. nilotica*, *A. catechuoides*, *Tamarindus indica*, *Phoenix sylvestris*, *Anogeissus latifolia*, *A. pendula*, *Wrightia tinctoria*, *Azadirachta indica*, *Boswellia serrata*, *Sterculia urens*, and *Butea monosperma*. The wetland has no major natural macrophytic population but the marginal areas have a rich growth of *Polygonum*. The weeds *Lantana camara* and *Parthenium* sp. infest the sanctuary area to a large extent, along with *Prosopis juliflora*.

The lake was proposed as a potential Ramsar Site in India as it meets Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of

one species or subspecies), and for its high ecological values (Islam & Rahmani 2008).

AVIFAUNA

This freshwater lake attracts a large number of migratory and resident birds. The islands with large reed beds provide safe nesting sites. More than 200 bird species are reported from the lake and its environs (Sharma 2002). The site qualifies for Biome 11 criteria. BirdLife International (undated) has identified 59 species in this biome, of which 27 are found here. Besides these, the lake harbours large congregations of about 20,000–25,000 Eurasian Coot *Fulica atra*, as well as Bar-headed Goose *Anser indicus* and Greylag Goose *A. anser* (Raza Tehsin, *pers. comm.* 2003). Species population estimates are not available, but it is likely that many species qualify under A4i criteria (their population exceeds the 1% threshold of their biogeographic populations). For instance, Wetlands International (2012) estimates that the total population of Eurasian Coot in South Asia is 1,500,000. This IBA supports 1% population. This site is, therefore, selected as an IBA principally based on the A4i and A4iii criteria.

It also holds Critically Endangered species such as the White-rumped *Gyps bengalensis* and the Long-billed *G. indicus* vultures, but they are now very rare and Jaisalmand does not have particularly significant populations. The wetland and the surrounding forest constitute this IBA.

OTHER KEY FAUNA

Leopard *Panthera pardus* is the top carnivore. Other predators include Jungle Cat *Felis chaus* and Striped Hyena *Hyaena hyaena*. Common Langur *Semnopithecus entellus* is the only primate found in the sanctuary. Other typical species of Dry Tropical forest and Scrub forest such as Wild Boar *Sus scrofa*, Chinkara *Gazella bennettii*, Spotted Deer *Axis axis*, Sambar *Cervus unicolor*, and Blue Bull *Boselaphus tragocamelus*, can be commonly sighted. Reptiles include Starred Tortoise *Geochelone elegans*, Bengal Monitor

Varanus bengalensis, Rock Python *Python molurus*, John's Earth Boa *Eryx johnii*, Rat Snake *Ptyas mucosus*, Common Krait *Bungarus caeruleus*, and Cobra *Naja naja* are also found in the sanctuary.

LAND USE

- Aquaculture
- Irrigation and water supply
- Tourism and recreation
- Nature research and conservation

THREATS AND CONSERVATION ISSUES

- Excessive fishing
- Boating
- Pollution
- Encroachment (Island Resorts)
- Siltation
- Weed Infestation by *Lantana camara* and *Prosopis juliflora*
- Firewood collection
- Poaching
- Grazing

The Sanctuary area is excessively infested by the exotic *Lantana camara*, which poses a threat to the local vegetation. *Prosopis juliflora* is also degrading the natural habitat.

The Department of Forests, Wildlife Wing along with Natural Environment Education and Development (NEED) Organization, Udaipur conducts annual trekking for the general public and nature camps for school and college students to raise conservation awareness.

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CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
River Tern	<i>Sterna aurantia</i>

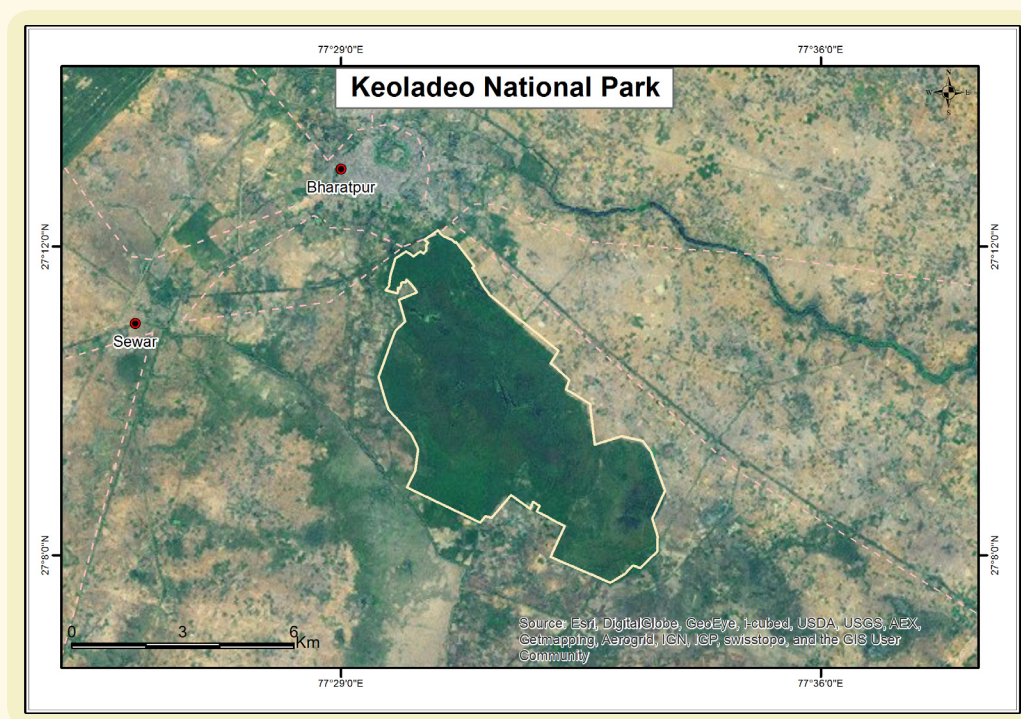
KEOLADEO NATIONAL PARK

IN-RJ-07

IBA Site	: IN-RJ-07	Area	: 2,873
State	: Rajasthan	Altitude	: 172–175 m
District	: Bharatpur	Rainfall	: 650 mm
Coordinates	: 27° 09' 33" N, 77° 31' 06" E	Temperature	: 2 °C to 49 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Wetland, Woodland

IBA CRITERIA: A1 (Threatened species), A4i (1% of biogeographic population), A4iii (≥ 20,000 waterbirds)

PROTECTION STATUS: National Park since 1981.



GENERAL DESCRIPTION

Keoladeo National Park, better known as the Bharatpur Bird Sanctuary, is renowned the world over for its avifauna. A great assortment of mammals can be sighted here as well.

A unique feature of the wetland ecosystem of the Keoladeo National Park (KNP) is its origin from a natural depression, which was an evanescent rainfed wetland (Vijayan 1994). The construction of Ajan Bandh, a temporary reservoir about a km from the present border of the park, some 250 years ago, and the subsequent flooding of the area, mark the beginning of human involvement in the conversion of this natural depression into a permanent waterfowl reserve (Vijayan 1990). Subsequently, several earthen bunds and sluice gates were constructed to contain and regulate the water level.

The water inside KNP, drawn through a canal from Ajan Bandh (3,270 ha) during the monsoon, gradually recedes and the park dries up in May-June, leaving only some pools in the deeper areas. These pools, which teem with fish, attract flocks of fish-eating birds. Apart from this, a large number of fish die in the drying pools and scavengers have a feast. Turtles become vulnerable to predation during this period, although many aestivate and some take refuge in deeper pools like Mansarovar located in the middle of the park. After severe drought between 2005 and 2010, efforts were made to bring water to the park from different sources. The situation began to improve after 2011, when other sources were opened and now the park receives water from Govardhan canal and Chambal river as well.

Floristic elements and vegetation of Rajasthan have been discussed in detail by Meher-Homji (1970) and Puri

et al. (1983). The flora of KNP has been studied extensively by Prasad *et al.* (1996). Keoladeo is a wonderful mix of woodland, marshes and savanna; more than 65 species of grasses belonging to nine families and 379 flowering plants have been recorded here (Grewal & Sahgal 2006). Two rare plants, namely *Neptunia oleracea* and *Centrostachys aquatica*, have been recorded here (Grewal & Sahgal 2006). The forest areas, which are small pockets mostly in the northeast section of the sanctuary, are dominated by *Mitragyna parviflora*, *Syzigium cumini*, *Acacia nilotica*, and an occasional *Azadirachta indica*. The open woodland is mostly *Acacia nilotica* with a small proportion of *Ziziphus mauritiana*. The scrubland is dominated by *Ziziphus*, *Capparis aphylla*, *Salvadora oleoides*, and *S. persica*. *Lantana camara* and *Adhatoda vasica* are common shrubs. Wild species of rice *Oryza rufipogon*, water lilies *Nymphaea* spp., and *Trapa* are the important wild macrophytes. Grasses such as *Khus Vetiveria zizanioides*, *Scirpus* sp. and *Desmostachya bipinnata* grow in the uplands, which are flooded for a short duration.

AVIFAUNA

One of the richest bird areas of the world, Keoladeo supports more than 350 bird species (Vijayan 1991). Another study conducted during three years from 2003 to 2006 revealed the presence of 343 species of birds (Venkitachalam *et al.* 2008). It is one of the best studied bird habitats in India. The site falls in Biome 12, representing the bird species of Indo-Gangetic Plains, besides the bird species of Biome 11 i.e., Indo-Malayan Tropical Dry Zone.

The Park qualifies as an IBA under A1 (Threatened species), A4i (1% threshold population), and A4iii ($\geq 20,000$ waterbirds). During good monsoon years, it is not uncommon to see a hundred thousand birds. It is one of the major breeding centres of the Painted Stork *Mycteria leucocephala*, Asian Openbill *Anastomus oscitans*, Eurasian Spoonbill *Platalea leucorodia*, Black-headed Ibis *Threskiornis melanocephalus*, Oriental Darter *Anhinga melanogaster*, and various egrets, herons, ibises, and other storks. Out of the 26 species of birds breeding in heronries in India, 15 species breed in Keoladeo (Venkitachalam & Vijayan 2009).

Many ducks, coot and rails occur much above their 1% threshold numbers. Up to five pairs of Black-necked Stork *Ephippiorhynchus asiaticus* breed in KNP. Two pairs of Pallas's Fish-eagle *Haliaeetus leucoryphus* used to breed till the late 1980s, but now this bird occurs only as an occasional winter visitor. Similarly, Greater Adjutant *Leptoptilos dubius* has also stopped coming. However, the most famous disappearance of any species is that of Siberian Crane *Grus leucogeranus*, which has declined from 200 birds in the 1960s to none in 2002. The Forest Department is considering the feasibility of constructing a semi-captive Siberian Crane

CRITICALLY ENDANGERED	
Baer's Pochard	<i>Aythya baeri</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Indian Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Siberian Crane (old record)	<i>Grus leucogeranus</i>
Sociable Lapwing	<i>Vanellus gregarius</i>
ENDANGERED	
Greater Adjutant (old record)	<i>Leptoptilos dubius</i>
Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>
VULNERABLE	
Dalmatian Pelican	<i>Pelecanus crispus</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Lesser Adjutant	<i>Leptoptilos javanicus</i>
Marbled Teal	<i>Marmaronetta angustirostris</i>
Indian Spotted Eagle	<i>Aquila hastata</i>
Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Greater Spotted Eagle	<i>Aquila clanga</i>
Eastern Imperial Eagle	<i>Aquila heliaca</i>
Sarus Crane	<i>Grus antigone</i>
Indian Skimmer	<i>Rynchops albicollis</i>
White-browed Bushchat	<i>Saxicola macrorhyncha</i>
NEAR THREATENED	
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Lesser Flamingo	<i>Phoenicopiterus minor</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Falcated Duck	<i>Anas falcata</i>
Lesser Fish-eagle	<i>Ichthyophaga humilis</i>
Grey headed Fish-eagle	<i>Ichthyophaga ichthyaetus</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Pallid Harrier	<i>Circus macrourus</i>
Red-headed Falcon	<i>Falco chicquera</i>
Laggar Falcon	<i>Falco jugger</i>
Great Thick-knee	<i>Esacus recurvirostris</i>
River Lapwing	<i>Vanellus duvaucelli</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>
European Roller	<i>Coracias garrulus</i>
Tytler's Leaf-warbler	<i>Phylloscopus tytleri</i>

exhibit centre here (Anon. 2012). Further details are given in Vijayan (1991) and subsequent papers.

According to Harsh Vardhan (*pers. comm.*, 2014). the following species have not been seen in recent years: Baer's Pochard *Aythya baeri*, Marbled Duck *Marmaronetta angustirostris*, Falcated Duck *Anas falcata*, Pallas's Fish-eagle *Haliaeetus leucoryphus*, Lesser Fish-eagle *Ichthyophaga humilis* and Grey-headed Fish Eagle *Ichthyophaga ichthyaetus*, Laggar Falcon *Falco jugger*, White-browed Bushchat *Saxicola macrorhyncha*, and Tytler's Leaf-warbler *Phylloscopus tytleri*.

OTHER KEY FAUNA

Important herbivores include the Cheetal *Axis axis*, Sambar *Cervus unicolor*, Blue Bull *Boselaphus tragocamelus*, Wild Boar *Sus scrofa*, Rufous-tailed Hare *Lepus nigricollis*, and Hog Deer *Axis porcinus*, whereas the commonly sighted predators include Golden Jackal *Canis aureus* and Jungle Cat *Felis chaus*. Fishing Cat *Prionailurus viverrina*, Striped Hyena *Hyaena hyaena*, Rhesus Macaque *Macaca mulatta* and Smooth Indian Otter *Lutra perspicillata* are also found in small numbers. Leopard *Panthera pardus* is sometimes sighted, and recently, a tigress *Panthera tigris* was seen for some months. Blackbuck *Antelope cervicapra* has become extinct in recent years, mainly due to habitat changes. In all, 27 species of mammals are reported from the area (Grewal & Sahgal 2006). Among the 28 species of reptiles found here, the Indian Python *Python molurus* is quite common and a major tourist attraction, besides the commonly seen Indian Monitor *Varanus bengalensis*. Many species of snakes including the common Rat Snake *Ptyas mucosus* and the Buff-striped Keelback *Amphiesma stolata* are found. Fifty species of fish are reported from the sanctuary (Grewal & Sahgal 2006).

LAND USE

- Tourism and recreation
- Nature conservation and research



ASAD R. RAHMANI

Owing to land use and water use changes in the surrounding areas in the last 20 years now water is brought through a pipe from Chambal river

THREATS AND CONSERVATION ISSUES

- Invasive species
- Illegal removal of biomass
- Pesticides from agricultural fields
- Extraordinary abundance of invasive catfish

The Park is undergoing severe floral changes following recurring droughts suffered in course of past fifteen years. A revision study of its aquatic vegetation is must to be taken up -- several species appear having disappeared. For example,



DHRITIMAN MUKHERJEE

The marshes of Keoladeo National Park are world famous for the number of waterfowl. Keoladeo is a World Heritage Site, a Ramsar Site, a National Park and an extraordinary IBA



DHIRTIMAN MUKHERJEE

Keoladeo supports more than 350 bird species and is famous for its heronries

the Smooth Indian Otter has not been observed for more than two and a half decades. Similarly, Indian Skimmer has not been seen for at least two decades.

Visitors to the Park have increased, especially in recent decades, their numbers fluctuating with the abundance of migratory waterfowl and colonial breeding birds. In the late 1980s, the number of visitors in a year averaged about 90,000 (Vijayan 1991) which went up to 125,000 in 2005 (Grewal & Sahgal 2006). The revenue earned through entry fees and transport facilities inside the park is significant. Local guides and rickshaw-pullers earn a sizeable income in the peak season, and so do the local food vendors, shopkeepers, and hoteliers. Since 30% of the visitors are from abroad, including many birdwatchers, nature lovers and photographers, KNP also helps earn foreign exchange for the country.

Major threats to the system arise from the irregular supply of water, extensive growth of vegetation inside the park, and the dependence of the park on the neighbouring villages and waterbodies. Growth of *Paspalum* and *Prosopis chilensis* also threatens the local species. In the summer of 2013, the park authorities, with the help of villagers and NGOs, eliminated *P. juliflora* from two blocks, resulting in a resurgence of the jheels.

Based on a 10 year study (Vijayan 1990, 1991) the BNHS has given recommendations for the management of this world-famous IBA. These recommendations should be followed strictly to restore this site to its former glory.

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Sarita Mehra, Himmat Singh, Harsh Vardhan

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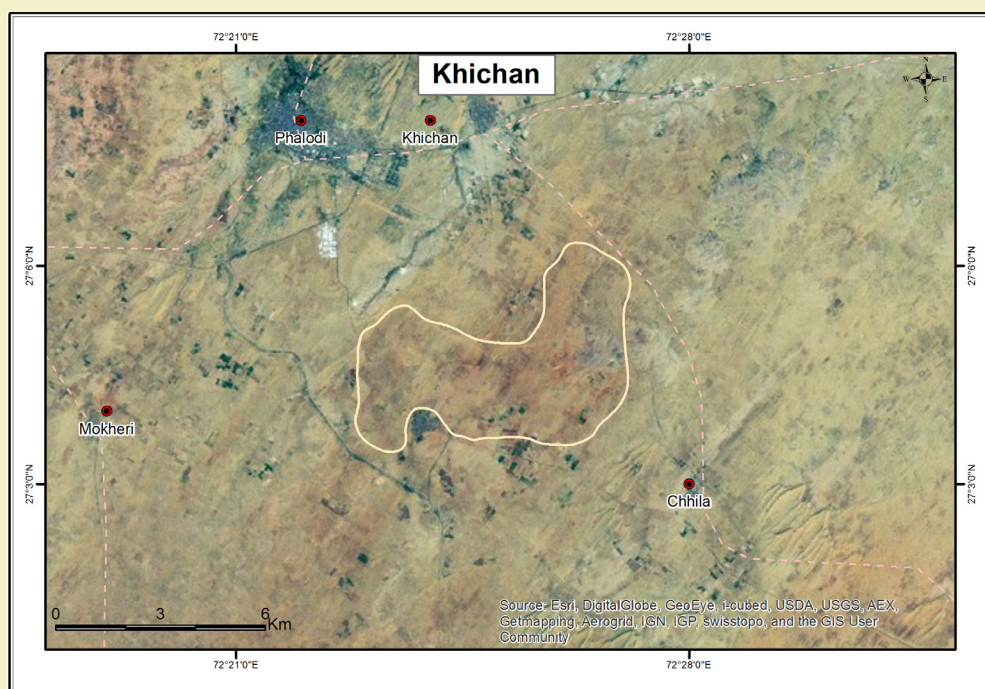
KHICHAN

IN-RJ-08

IBA Site	: IN-RJ-08	Altitude	: 219 m
State	: Rajasthan	Rainfall	: 150 mm
District	: Jodhpur	Temperature	: 2 °C to 48 °C
Coordinates	: 27° 07' 00" N, 72° 24' 00" E	Biogeographic Zone	: Desert
Ownership	: State	Habitats	: Wetland, Sand dunes, Thorny scrub
Area	: Undefined		

IBA CRITERIA: A1 (Threatened species), A4i (1% of biogeographic population)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

Khichan, 150 km north of Jodhpur in the northern part of the Thar Desert, Rajasthan, is a small village off the tourist map. The village has recently been recognized as a tourist spot by the Rajasthan Tourism Development Corporation, mainly due to the presence of large flocks of wintering Demoiselle Cranes *Grus virgo*. Until the 1970s, the Demoiselle Crane used to visit Khichan in very small numbers (maximum 150). It was with the introduction of artificial feeding of cranes as a religious practice by an old couple that their numbers started increasing. Some say that this practice has been continuing since the last 150 years. From hundreds in the 1970s they became thousands in 1990s, and 11,505 ($\pm 10\%$) in the migration season of 2004–2005 (Jain *et al.* 2013).

Khichan is located in a sandy desert area, so it has the typical xerophytic vegetation of the Thar. Among the

tree species, *Prosopis cineraria* and *Salvadora* sp. are the commonest.

Khichan was proposed as a potential Ramsar Site as it meets Ramsar Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies), and for its high ecological values (Islam & Rahmani 2008).

AVIFAUNA

Every year, towards the end of August and in early September, just after the monsoon ceases, Demoiselle Cranes fly in from their breeding grounds on the steppes of Eurasia and Mongolia. The village is transformed overnight into a noisy crowded place, as *krok-krok* calls fill the air. The cranes have been attracted because for the last 150 years, villagers traditionally have fed them in a feeding house locally known as *Chugga ghar*. The number recorded by Rahmani (1997) was about 4,000 but villagers claim that

sometimes up to 10,000 are seen. In 1996, about 6000 birds visited the village (Pathak 2007). The west Central Asia breeding population, which comes to the Indian subcontinent (especially western India) is estimated to be 100,000 birds (Wetlands International 2012). Khichan has been selected as an IBA because it holds more than around 4-10% of the wintering population of Demoiselle Crane.

Besides the Demoiselle Crane, Khichan holds most of the Thar desert fauna and flora. The Great Indian Bustard *Ardeotis nigriceps* was earlier reported, but there is no authentic record during the last 10 years. The two village ponds attract assorted numbers of ducks and waders, but not in any significant number. The Black-capped Kingfisher *Halcyon pileata*, a coastal wetland bird (Grimmett *et al.* 1998) has been sighted here.

Among the globally threatened species, White-rumped Vulture *Gyps bengalensis* and Long-billed Vulture *Gyps indicus* are occasionally seen, albeit in very small numbers. White-browed (Stoliczka's) Bushchat *Saxicola macrorhyncha* may be present in the surrounding scrub areas but there is no confirmed record.

OTHER KEY FAUNA

Common mammals found in Khichan are the Red Fox *Vulpes vulpes bengalensis* and Chinkara *Gazella bennettii*. Blue Bull *Boselaphus tragocamelus* is spreading due to availability of water from the Indira Gandhi Nahar Project (IGNP).

LAND USE

- Human settlement
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Disturbance to birds by stray animals and visitors
- Encroachment
- Upcoming wind mills
- Stray dogs

Since the Demoiselle Cranes were often disturbed by stray dogs and passing villagers, a small feeding place (50 x 60 m) was set up at the edge of the village. However, this area has now become too small for the huge flocks of cranes that come to feed, so another solution should be found. Further problems have ensued from new settlers encroaching upon vacant government land and building houses, which now hamper the preferred flight path of the birds. This has created tension in the village between conservationists who want to assure the safety and peace of the cranes, and politicians who see the new settlers as potential voters, and support their stand. The local authorities have already had some of the unauthorized constructions removed under police escort, but the opposition continues to pressurize them.

The Rajasthan Tourism Department wanted to build a hotel very close to the crane roosting site 'to boost tourism', but this ill-conceived plan was dropped after protests by



Khichan with its famous Demoiselle Crane *Grus virgo* is one of the finest examples of community conservation



In 2009 Bombay Natural History Society honoured the people of Khichan by conferring Sálím Ali Community Conservation Award



Demoiselle Crane *Grus virgo* are provided grains at birds feeding home from the donation by villagers and visitors

conservationists that the tourist complex would disturb the cranes.

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Asad R. Rahmani, Manoj Kulshreshtha, Krishna Kumar Vyas, Satyanarain Rajpurohit, Himmat Singh.

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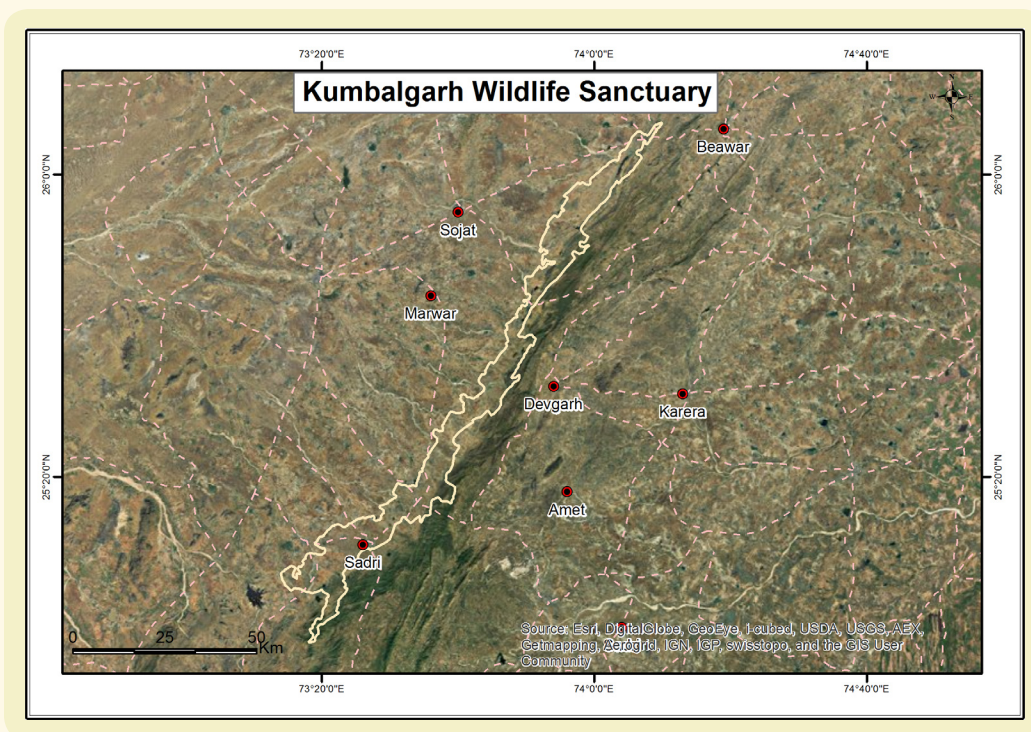
KUMBHALGARH WILDLIFE SANCTUARY

IBA Site	: IN-RJ-09	Altitude	: c. 910 msl
State	: Rajasthan	Rainfall	: 725 mm
Districts	: Udaipur, Pali, Rajsamand	Temperature	: 2 °C to 48 °C
Coordinates	: 24° 33' 23" N, 73° 54' 13" E	Biogeographic Zone	: Semi-arid
Ownership	: State	Habitats	: Tropical Dry Deciduous Forest,
Area	: 77,825 ha		

IN-RJ-09

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Wildlife Sanctuary, established July 1971.



GENERAL DESCRIPTION

The Kumbhalgarh Wildlife Sanctuary in the Aravalli ranges is situated in the hilly tracts of Rajsamand, Udaipur, and Pali districts. These wooded tracts formed the dividing line between the erstwhile states of Mewar and Marwar, and were favoured hunting grounds of the rulers of these states.

Kumbhalgarh commands a spectacular view of the vast sandy plains of Marwar to the west, the northeast to southwest ranges of the Aravallis in the middle, and the undulating plains of Mewar to the east. The sanctuary forms a dividing line between the two major watersheds of Rajasthan. To its eastern side is the source of the River Banas, which flows into the Bay of Bengal through the Rivers Chambal, Yamuna, and Ganga. The rainwater on the western slopes forms small rivers including Sukdi, Mithadi, Sumer, and Kot, which are tributaries of River Luni

that flows into the Great Rann of Kutch. The sanctuary is well known for the presence of a large population of Grey Junglefowl *Gallus sonneratii* and Grey Wolf *Canis lupus*. It is also one of the best protected forests remaining in the Aravalli mountains.

From the floral point of view, it is a rich Sanctuary. As many as 515 flowering plant species have been recorded (Sharma 2005, 2011, 2014; Sharma & Kotia 2008). The sanctuary is rich in gymnosperms also (Choudhary & Khichi 2006, 2007; Sharma 2008).

The sanctuary is connected by road to Udaipur (75 km), Rajsamand (40 km), and Pali (80 km). The nearest railway station is Falna.

AVIFAUNA

Perennial waterbodies and streams in the sanctuary support dense forest cover. More than 200 bird species

CRITICALLY ENDANGERED

Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Sarus Crane	<i>Grus antigone</i>
Indian Skimmer	<i>Rhynchops albicollis</i>
White-naped Tit	<i>Parus nuchalis</i>
Green Munia	<i>Amandava formosa</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Laggar Falcon	<i>Falco jugger</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
European Roller	<i>Coracias garrulus</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Painted Francolin	<i>Francolinus pictus</i>
Red-naped Ibis	<i>Pseudibis papillosa</i>
Rain Quail	<i>Coturnix coromandelica</i>
Rock Bush-quail	<i>Perdica argoondah</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Dusky Eagle-owl	<i>Bubo coromandus</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Grey Hornbill	<i>Ocyrceros birostris</i>
Brown-headed Barbet	<i>Megalaima zeylanica</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Red-winged Bush-lark	<i>Mirafra erythroptera</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Jungle Prinia	<i>Prinia sylvatica</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Green Munia	<i>Amandava formosa</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>
White-naped Tit	<i>Parus nuchalis</i>
Tawny-bellied Babbler	<i>Dumetia hyperythra</i>

are reported (Sharma 2002; Chhangani 2002; Sharma *et al.* 2012), and it is rich in raptor fauna. Sarus Crane *Grus antigone* and Indian Skimmer *Rynchops albicollis*, reported by Sharma (2002) and Chhangani (2002) respectively, are globally Threatened.

Kumbhalgarh is an excellent representative of the natural vegetation and avifauna of the Aravalli. Out of 59 bird species of Biome 11 (Indo-Malayan Tropical Dry Zone), 25 are found here. The site was selected on the basis of criteria A3 (biome-restricted assemblages), although some Threatened species are also found.

OTHER KEY FAUNA

Among the large mammals, the sanctuary harbours Leopard *Panthera pardus*, Sloth Bear *Melursus ursinus*, Wild Boar *Sus scrofa*, Sambar *Rusa unicolor*, Spotted Deer *Axis axis*, Chinkara *Gazella bennettii*, Four-horned Antelope *Tetracerus quadricornis*, and Blue Bull *Boselaphus tragocamelus*. Northern plains Langur *Semnopithecus entellus* is a commonly seen primate of the sanctuary. Grey Wolf *Canis lupus*, Golden Jackal *C. aureus*, Striped Hyaena *Hyaena hyaena*, Indian Fox *Vulpes bengalensis*, Indian Pangolin *Manis crassicaudata*, Indian Crested Porcupine *Hystrix indica*, Grey Mongoose *Herpestes edwardsii*, Ruddy Mongoose *Herpestes smithi*, Small Indian Mongoose *Herpestes javanicus*, and Black-naped Hare *Lepus nigricollis* are the more commonly observed small mammals. This sanctuary possesses 20 species of reptiles also (Gaur & Pandey 2007).

LAND USE

- Tourism and recreation
- Nature conservation and research
- Water management
- Plantation

THREATS AND CONSERVATION ISSUES

- Grazing
- Poaching
- Illegal felling of trees
- Agricultural expansion
- Human settlements
- Firewood collection
- Man-animal conflict
- Hotels mushrooming at periphery
- Scarcity of water
- Fire hazard
- Invasive species *Lantana camara* and *Prosopis chilensis*

Due to village settlements in adjacent areas, activities such as collection of firewood, illegal felling of trees, and poaching are known to occur inside the sanctuary area. Strict patrolling is needed to prevent such activities. Awareness campaigns are required to control poaching and killing of animals. The Muchalla Maharaj Temple Trust is helping the Forest Department to look after injured animals inside the sanctuary, as well as the other wild fauna. The Trust has opened a small hospital to provide medical aid to the animals.



DHIRTIMAN MUKHERJEE

Kumbhalgarh in Udaipur, Pali and Rajsamand districts has one of the finest natural forest left in the Aravallis

Many eco-development committees are also helping in wildlife conservation. A Medicinal Plant Conservation Area (MPCA) has been established to provide special protection to *Boswellia serrata* near Parshuram Mahadeo temple.

The site has abundant flora with dense cover in the core area, which has not yet been studied due to the remote undulating landscape. This area needs field surveys to document the fauna and flora. Rodgers & Panwar (1988) have strongly recommended establishment of a 20,000 ha National Park as core area to prevent biotic pressures and to provide water conservation benefits.

Recently Chhangani *et al.* (2013) have described threats to the faunal diversity of the Aravalli Hills, particularly to Kumbhalgarh WLS. They have listed 155 mammals of 17 species, 144 birds of 21 species, and 75 reptiles of five species that were killed between December 1995 and August 1998. Additionally, many animals, though not killed in accidents, were seriously injured. There are many other threats to this remarkable representative of Aravalli Hills forests, such as unregulated forest fires, illegal tree cutting, spread of invasive species, and overgrazing in certain areas.

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Kumbhalgarh Wildlife Sanctuary is one of the few areas in Rajasthan where Four-horned Antelope *Tetracerus quadricornis* is found

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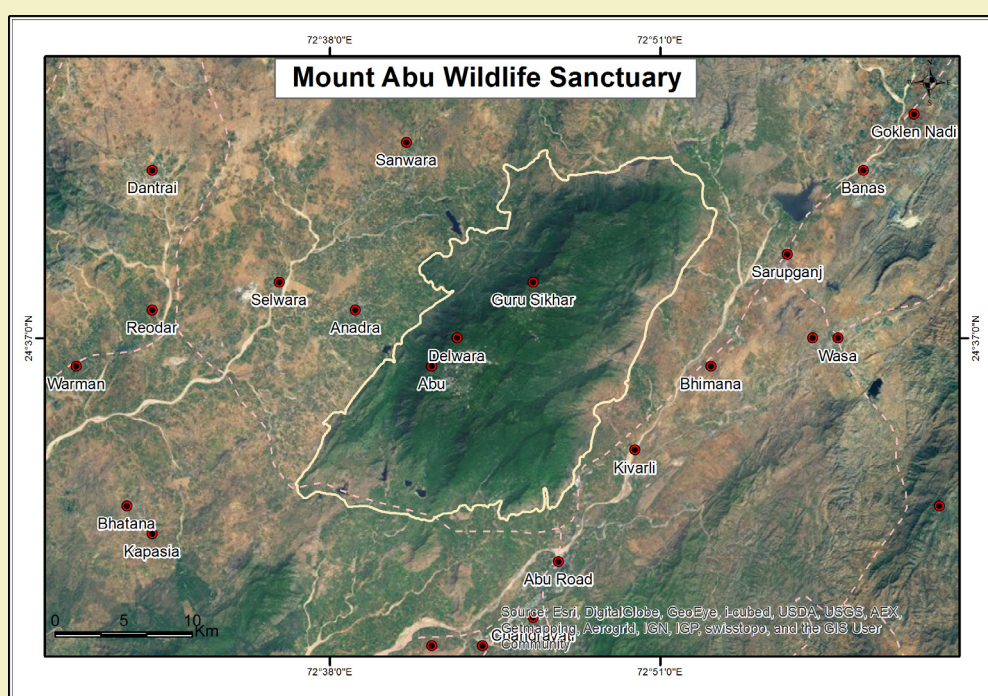
sightings of Green Avadavat *Amandava formosa* in a few localities in Southern Aravalis, India. *JBNHS* 109(3): 204–205.
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MOUNT ABU WILDLIFE SANCTUARY

IBA Site	: IN-RJ-10	Altitude	: 1,219 m
State	: Rajasthan	Rainfall	: 1,500 mm
District	: Sirohi	Temperature	: 2 °C to 35 °C
Coordinates	: 24° 40' 50" N, 72° 47' 05" E	Biogeographic Zone	: Semi-arid
Ownership	: State	Habitats	: Tropical Semi-evergreen Forest, Tropical Dry Deciduous Forest, Subtropical Thorn Forest
Area	: 28,884 ha		

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Wildlife Sanctuary, established in April 1960.



GENERAL DESCRIPTION

The only hill station in Rajasthan, Mount Abu is considered one of the most beautiful locations in the state. It comprises the famous Arbuda Hills (1,250–1,700 m) of the Aravalli range, made up of several valleys and steep mountain slopes. Gurur Shikhar (1,722 m), located at the summit in the Arbuda Hills, is the highest peak between the Himalaya and the Nilgiri Hills. Mount Abu has several Hindu temples and a cave at the summit containing a temple of Dattatreya, an incarnation of the Hindu trinity – Brahma, Vishnu, and Shiva. Adjacent to the temple is the Mount Abu Observatory, harbouring an infra-red telescope and advanced astronomical equipment. It is also home to a number of tourist attractions, from natural beauty to historical and architectural places, like Dilwara, a complex of Jain temples carved out of white marble, that was built

between the 11th and 13th centuries CE.

Mount Abu is situated in the southwest region of Rajasthan, and separates the Western Desert Region from the Eastern Plateau and hilly terrain. By road, it is 28 km from Abu Road, which is c. 85 km from the district headquarters Sirohi.

This site has very rich floral diversity, with xeromorphic Subtropical Thorn forest at the foothills to Subtropical Semi-evergreen forest along watercourses and valleys at higher altitudes. Due to this wide range of habitats, this site harbours rich avifaunal diversity. Good populations of Grey Junglefowl *Gallus sonnerati* and Red Spurrow *Galloperdix spadicea* are found in the sanctuary.

The site contains about 830 plant species from 112 families of which 328 species are of medicinal value. Mt. Abu is one of important endemic species centers of Rajasthan. *Dicliptera*

abuensis. *Rivularia gobiceps abuensis* (Algae), *Physcia abuensis* (Lichen), *Riccia abuensis* (Bryophyta), *Asplenium pumilum hymenophylloides* (Fern), *Cheilanthes aravallensis* (Fern), *Dicliptera abuensis* (Dicot plant), *Strobilanthes halbergii* (Dicot plant), *Lindernia bracteoides* (Dicot plant), *L. micrantha* (Dicot plant), *Veronica anagallis-aquatica* var. *bracteosa* (Dicot plant), *V. beccabunda* var. *attenuata* (Dicot plant), *Apluda blatteri* (Monocot plant) and *Ischaemum kingii* (Monocot plant) are strictly endemic to Abu (Sharma, 2014). The dominant plant species are *Anogeissus latifolia*, *Anogeissus sericea*, *Boswellia serrata*, *Mangifera indica*, *Phoenix sylvestris*, *Ficus bengalensis*, other *Ficus* species, *Carissa spinarum*, *Caesalpinia decapetala* and *Zizyphus mauritiana* and *Z. xylopyrus*.

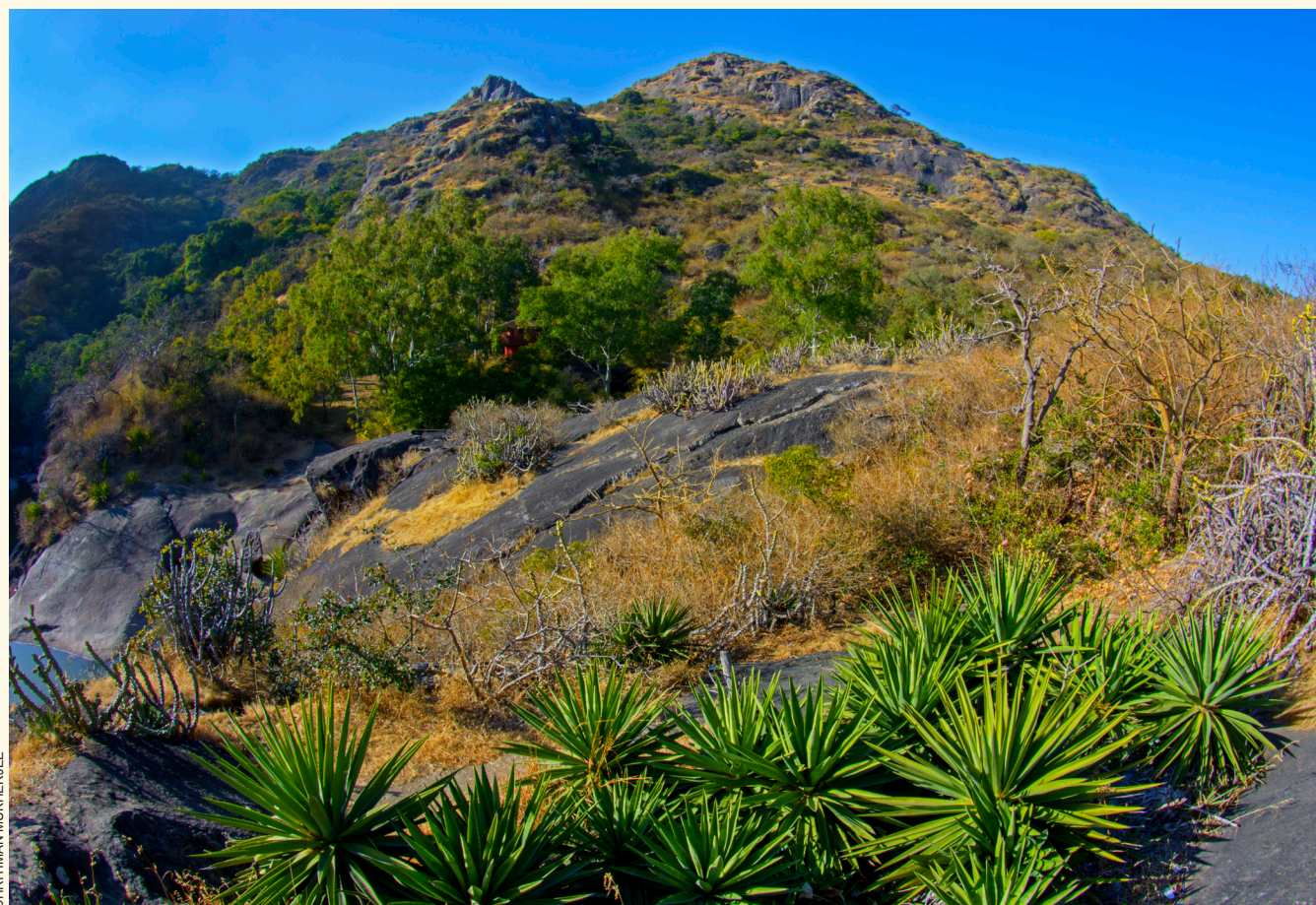
AVIFAUNA

Nearly 135 bird species have been reported by Sharma (2002), including two Critically Endangered species, White-rumped Vulture *Gyps bengalensis* and Long-billed Vulture *Gyps indicus*, and two Vulnerable species, Green Munia *Amandava formosa* and White-naped (Pied) Tit *Parus nuchalis*. Sangha & Devarshi (2006) reported 146 species of birds. They have given details of the sight records of all the species, including threatened species like Oriental Darter *Anhinga melanogaster*, Egyptian Vulture *Neophron*

percnopterus, Woolly-necked Stork *Ciconia episcopus*, Indian Skimmer *Rynchops albicollis*, and Alexandrine Parakeet *Psittacula eupatria*. European Roller *Coracias garrulus* was reported here by Trivedi (2003). Mount Abu is a good example of the relict extant natural vegetation of the Aravallis. It lies in Biome 11 (Indo-Malayan Tropical Dry Zone). BirdLife International (undated) has identified 59 bird species from this biome, which includes a wide range of habitats, both forests and open country. Many of the species listed have adapted to man-modified landscapes. Some species have changed their distribution so much that they are also present in other biomes. Nevertheless, 32 out of 59 species of this biome have been recorded. Out of the seven species of munias reported from India, five are found here (Mehra *et al.* 2005).

This site is selected as an IBA mainly on the basis of its assemblage of birds of Tropical Dry Deciduous and its relict patch of Tropical Semi-evergreen forests and also for the presence of good populations of Green Munia and White-naped (Pied) Tit.

Green Munia appears to be well distributed in this IBA (Tiwari and Varu, 1999; Lodhiya, 1999). They are seen near Salgaon, Oriya, Adhar Devi Temple forest, Teachers's Training Centre, Kanyakumari Temple, Mini Nakki Lake and Delwara Temple. They prefer agricultural fields,



DHIRTIMAN MUKHERJEE

Mount Abu in the south-west region of Rajasthan has very rich floral diversity with xeromorphic Subtropical Thorn Forest at the foothills, Subtropical Semi-evergreen forest along water courses, valleys and higher altitudes

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Indian Skimmer	<i>Rynchops albicollis</i>
White-naped (Pied) Tit	<i>Parus nuchalis</i>
Green Munia	<i>Amandava formosa</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Red-headed Falcon	<i>Falco chicquera</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
European Roller	<i>Coracias garrulus</i>

BIOME-11: INDO-MALAYAN TROPICAL DRY ZONE

White-eyed Buzzard	<i>Butastur teesa</i>
Red-headed Falcon	<i>Falco chicquera</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Rock Bush-quail	<i>Perdica argoondah</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicopterus</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrocus birostris</i>
Brown-headed Barbet	<i>Megalaima zeylanica</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Indian Chat	<i>Cercomela fusca</i>
Rufous-bellied Babbler	<i>Dumetia hyperythra</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Chestnut-tailed Starling	<i>Sturnus malabaricus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>
Ashy Woodswallow	<i>Artamus fuscus</i>

bushes, woodland and grass patches. Mehra & Sharma (2004) described additional site records of Green Munia in June 2004. These include Palanpur Point (two birds), near Kanyakumari Temple (four birds), Pandu Caves (five pairs), and at Achalgarh (50 birds). Mehra *et al.* (2005) found the Green Munias to be rare above 1500 m, common at altitudes ranging between 900–1500 m, and absent below 900 m.

Mount Abu WLS has a disjunct population of Grey Junglefowl *Gallus sonneratii*. The species was quite abundant on Shanti Shikhar Hill and in Guru Shikhar region, but is now

much reduced in number due to trapping by tribals (Prakash & Singh 1995). This species is not threatened (BirdLife International 2001) but its presence, in the small surviving relict semi-evergreen forests in an otherwise very dry area, is of interest. The nearest population of this essentially south Indian species is Pachmarhi (c. 22° 30'N; 78° 25'E) in Madhya Pradesh (Ali & Ripley 1987).

Another taxon worth noting is the Aravalli Red Spurfowl *Galloperdix spadicea caurina*, a subspecies of the Red Spurfowl (Ali & Ripley 1987). Although the Red Spurfowl is not threatened, the Aravalli subspecies has a very small distribution, with Mount Abu as its principal stronghold. Protection of this site is important for the survival of this subspecies. There are some more subspecies that are found in this IBA, such as Rajasthan Spotted Grey Creeper *Salpornis spilonotus rajputanae* that is found from Sambhar to Mt. Abu in the Aravalli Hills (Ali and Ripley 1987), Mt. Abu White-throated Babbler *Dumetia hyperythra abuensis* Rajasthan Red-whiskered Bulbul *Pycnonotus jocosus abuensis*, and Mount Abu Scimitar Babbler *Pomatorhinus schisticeps obscures*.

OTHER KEY FAUNA

The most common large mammals in the sanctuary are Northern Plains Grey Langur *Semnopithecus entellus*, Sambar *Cervus unicolor*, Spotted Deer *Axis axis*, and Chowsingha or Four-horned Antelope *Tetracerus quadricornis*. Leopard *Panthera pardus* and Sloth Bear *Melursus ursinus* are occasionally sighted, generally near water holes. Small Indian Civet *Viverricula indica*, Jungle Cat *Felis chaus*, Porcupine *Hystrix indica*, Ratel or Honey Badger *Mellivora capensis*, Indian Pangolin *Manis crassicaudata*, Bengal Fox *Vulpes bengalensis* and Golden Jackal *Canis aureus* are the common lesser mammals.

LAND USE

- Tourism and recreation
- Nature conservation and research
- Watershed management
- Plantation
- Pilgrim centre

THREATS AND CONSERVATION ISSUES

- Forest fires
- Poaching
- Illegal felling of trees
- Disturbance to birds by tourists
- Invasive species (*Lantana camara*)
- Introduction of exotics *Eucalyptus* and *Grevillea*
- Tourism pressure
- Pilgrim pressure
- Excessive wild fruit and certain medical plant collection

The Sanctuary has a large human settlement. Urbanization is increasing due to the importance of Mount Abu as a tourist location. The Government of Rajasthan has ordered a check on new constructions in Mount Abu but strict implementation is lacking.

In Mount Abu, habitat loss is the predominant threat to Green Munia. Although construction activities are banned in the sanctuary area, illegal clearing of land does happen (Mehra & Sharma 2004). Being a tourist spot, development of hotels and other temporary activities, like camping or parking of vehicles near or on the feeding areas of Green Munia, threaten the species (Mehra & Sharma 2004). The activities of religious tourists also tend to disturb the munias (Mehra *et al.* (2005).

Besides heavy tourist traffic because of the religious importance of the place, introduction of exotic plants *Eucalyptus* and *Grevillea robusta*, and infestation by the exotic *Lantana camara*, have also disturbed the natural vegetation of the Mount Abu region. Several NGOs conduct nature camps and awareness camps inside the sanctuary with the collaboration of the Forest Department. To some extent, this helps to create awareness among the local people of the need to protect Abu from further deterioration. Rodgers & Panwar (1988) have suggested declaration of a 5,000 ha core area as Mount Abu National Park, to provide better protection, as Mount Abu is of considerable biogeographical and ecological importance as an island of semi-evergreen forest in a semi-arid location.

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This IBA is famous for the presence of the Green Munia *Amandava formosa* (above) and Pied Tit *Parus nuchalis*

DHRITIMAN MUKHERJEE

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NATIONAL CHAMBAL WILDLIFE SANCTUARY

IBA Site Code : IN-RJ-11

State : Rajasthan

District : Kota, Bundi, Sawai Madhopur,
Dholpur

Coordinates : 20° 40' 29" N,
78° 04' 59" E

Ownership : State

Area : 520 sq. km (sanctuary 280 sq. km in
Rajasthan)

Altitude : 252 m at Kota to 190 m at Dholpur

Rainfall : 600 mm

Temperature : 3 °C to 48 °C

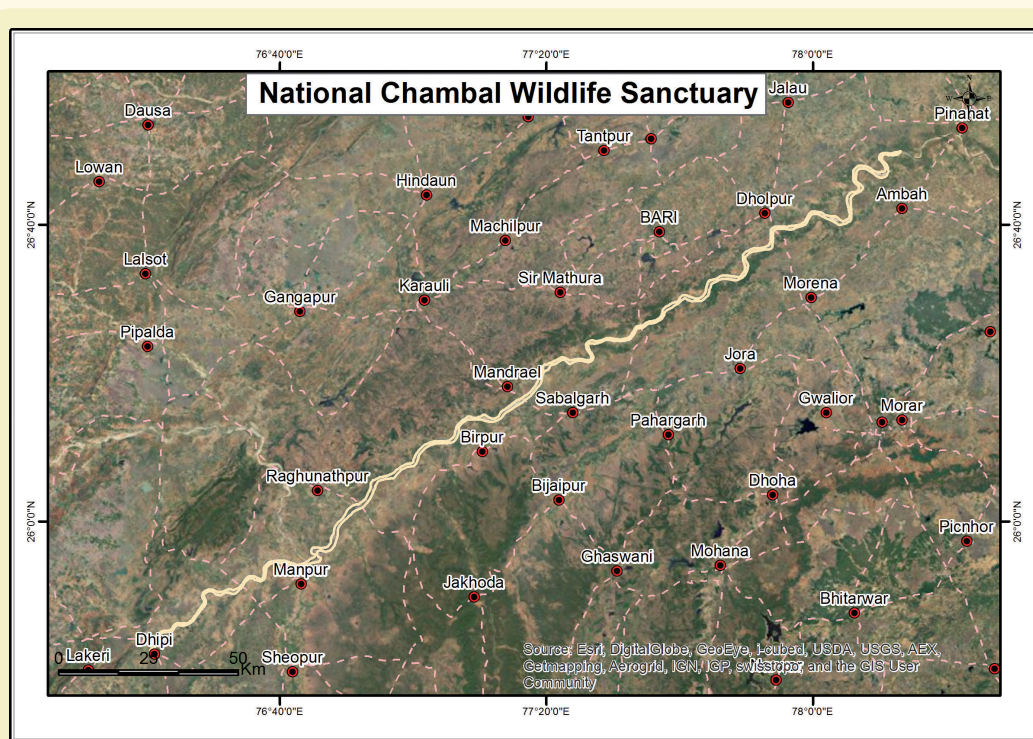
Biogeographic Zone : Semi-arid

Habitats : Wetland, Riverine Vegetation

Coordinates: Areas near Kota 25.0363N, 75.6776E to 25.1760N, 75.8273E. Near Palighat 25.7467N, 76.3618E to 25.9092N, 76.7319E to 25.9092N, 76.7319E. Near Dholpur 26.5971N, 77.8271E to 26.6701N, 78.0750E.

IBA CRITERIA : A1 (Threatened species), A4i (1% of global population)

PROTECTION STATUS : Wildlife Sanctuary (Gharial Sanctuary), established in 1978.



GENERAL DESCRIPTION

National Chambal Gharial Sanctuary is one of the most important riverine sanctuaries in India. It was created in 1978 specifically for the protection of the aquatic reptile Gharial *Gavialis gangeticus*, which has been listed as Critically Endangered by IUCN. The Sanctuary extends over 650 km across the states of Rajasthan, Madhya Pradesh, and Uttar Pradesh. It is a linear sanctuary on the Chambal River, with some areas on both sides included in the sanctuary. As it is in three states, we are describing here the Rajasthan

part. A part of the Chambal from the confluence of Mej and Chambal to Rameshwaram in Sawai Madhopur district needs inclusion, as do areas 5 km upstream and downstream from Dholpur. The area in question is a 26 km stretch of river between Jawahar Sagar Dam and Kota Barrage, where the river flows through a 100–150 m gorge. About 200 species of birds have been recorded in the sanctuary. Another checklist of birds of the sanctuary contains 319 species (downloaded from http://nationalchambalsanctuary.in/check_list.html as on 11 September 2014).



National Chambal Sanctuary was declared for the protection of Gharial *Gavialis gangeticus* which has been listed as Critically Endangered by IUCN. This linear sanctuary located in 3 states (Rajasthan, Uttar Pradesh and Madhya Pradesh) is also famous for its bird life

The vegetation of National Chambal Sanctuary mainly comprises riverine species along the banks of the river and the deciduous species in the region away from the river. Riverine species present near the banks include *Terminalia arjuna*, *Ficus glomerata*, and *Syzygium cumini*. The surrounding forest is dominated by *Anogeissus pendula*, *Boswellia serrata*, and *Sterculia urens* (Satish. K. Sharma, pers. comm. 2003).

This IBA was proposed as a potential Ramsar Site as it meets Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 7 (wetland supports a significant proportion of indigenous fish), Criteria 9 (wetland supports 1% or more of the global population of a non-avian animal species), and for its high ecological values (Islam & Rahmani 2008).

AVIFAUNA

Earlier 150 bird species were reported from the site by Vyas (1998). A recent paper (Nair & Krishna 2013) mentions 308 species of birds in Chambal. Another recent checklist records 319 species of birds in Chambal WLS (www.nationalchambalsanctuary.in as accessed on September 9, 2014). Five species of vultures, four species of storks, Great Horned Owl *Bubo bubo*, Sarus Crane *Grus antigone*, Indian Skimmer *Rynchops albicollis*, Small Indian Pratincole *Glareola lactea*, and River Lapwing *Vanellus duvaucelli* are some of the common residents. During winter, large congregations of Large Cormorant *Phalacrocorax carbo*, Ruddy shelduck *Tadorna ferruginea*, and Black-headed Gull *Larus ridibundus* may be seen.

Approximately 150–200 nests of Long-billed Vulture *Gyps indicus* have been sighted from the area in the past, between Jawahar Sagar and Kota, and about 25 near Dholpur at Damoh (but the present status is not known). Egyptian Vulture *Neophron percnopterus* and Asian Woollyneck *Ciconia episcopus* are known to breed in the sanctuary. Breeding of Egyptian Vulture, Laggar Falcon *Falco jugger*, Black-bellied Tern *Sterna acuticauda*, River Tern *Sterna aurantia*, and River Lapwing *Vanellus duvaucelli* is regularly reported in the Dholpur part of the sanctuary.

OTHER KEY FAUNA

Eleven species of reptiles and 22 species of mammals are found in the sanctuary, including the Endangered Gangetic River Dolphin *Platanista gangetica* and the Hedgehog *Paraechinus micropus* (*Hemiechinus micropus*) (downloaded from http://nationalchambalsanctuary.in/check_list.html as on 11 September 2014). Gharial *Gavialis gangeticus* and Marsh Crocodile *Crocodylus palustris* are common, and the most important fauna after which the sanctuary is named (Rao 1998). Red-crowned Roofed Turtle *Batagur kachuga*, Chitra Turtle *Chitra indica*, Indian Softshell Turtle *Nilssonina gangetica* (*Aspideretes gangeticus*), and Small Indian Otter *Lutra lutra* constitute other important fauna (Satish K. Sharma, pers. comm. 2003). S.A. Hussain studied the ecology of the Vulnerable Smooth-coated Indian Otter *Lutrogale (Lutra) perspicillata* here.

A recent paper (Nair & Krishna 2013) has provided a consolidated checklist of vertebrate fauna of the Chambal River Basin with emphasis on the National Chambal

CRITICALLY ENDANGERED	
White-rumped Vulture	<i>Gyps bengalensis</i>
Indian Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
ENDANGERED	
Black-bellied Tern	<i>Sterna acuticauda</i>
Egyptian Vulture	<i>Neophron percnopterus</i>
VULNERABLE	
Dalmatian Pelican	<i>elecanus crispus</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Sarus Crane	<i>Grus antigone</i>
Greater Spotted Eagle	<i>Clanga clanga</i>
Indian Spotted Eagle	<i>Clanga hastata</i>
Eastern Imperial Eagle	<i>Aquila heliaca</i>
Indian Skimmer	<i>Rynchops albicollis</i>
Green Munia (Avadavat)	<i>Amandava formosa</i>
NEAR THREATENED	
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Pallid Harrier	<i>Circus macrourus</i>
Red-headed Falcon	<i>Falco chicquera</i>
Laggar Falcon	<i>Falco jugger</i>
Great Thick-knee	<i>Esacus recurvirostris</i>
River Lapwing	<i>Vanellus duvaucelli</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>

Sanctuary. The paper enlists a total of 147 species of fish (32 families), 56 species of reptiles (19 families), 308 species of birds (64 families), and 60 species of mammals (27 families), including six Critically Endangered, 12 Endangered, and 18 Vulnerable species, as categorized by the IUCN Red List of Threatened Species.

Between 1992 and 2000, the population of Gharial has declined by 40% (Hussain *et al.* 2013).

LAND USE

- Nature conservation and research
- Tourism and recreation
- Irrigation

THREATS AND CONSERVATION ISSUES

- Release of water during the breeding season of Indian Skimmer and other ground-nesting birds.
- Increasing demand to draw water from the Chambal river by three states
- Quarrying and sand mining
- Illegal fishing
- Cultivation on the river banks
- Building of multiple dams on the river.

There are plans for numerous irrigation projects in the Chambal River basin. These threats have not ceased,

indeed they have increased and continue to compromise the survival of various species. This has resulted in the decline of the Gharial population along with the decline of other riverine taxa once reportedly abundant and now endangered, including the Gangetic River Dolphin *Platanista gangetica* (Sharma *et al.* 2003) and the Vulnerable Mugger *Crocodylus palustris*, as well as numerous waterfowl and well known game and edible fish species including the Mahseer *Tor* sp. and Hilsa *Hilsa illisha* (<http://www.iucnredlist.org/details/8966/0>) as downloaded on 10 September 2014).

Hussain *et al.* (2013) have summarized the conservation measures needed for the Chambal river basin. The major issues affecting its integrity are increasing human population; extraction of river water by the adjoining states of Madhya Pradesh, Rajasthan, and Uttar Pradesh; discharge of industrial and domestic effluents into the river; and control of soil erosion and ravine formation. There is a need for development and strengthening of the policy and legislation support for integrated river basin management, involvement of stakeholders, and minimizing the impacts of land use and water extraction. There is a need to involve local communities through ecotourism, existing network of forest protection, and village eco-development committees located in the basin.

KEY CONTRIBUTORS

Rakesh Vyas, Satish K. Sharma, Sitaram Taigor, Rajeev Tomar.

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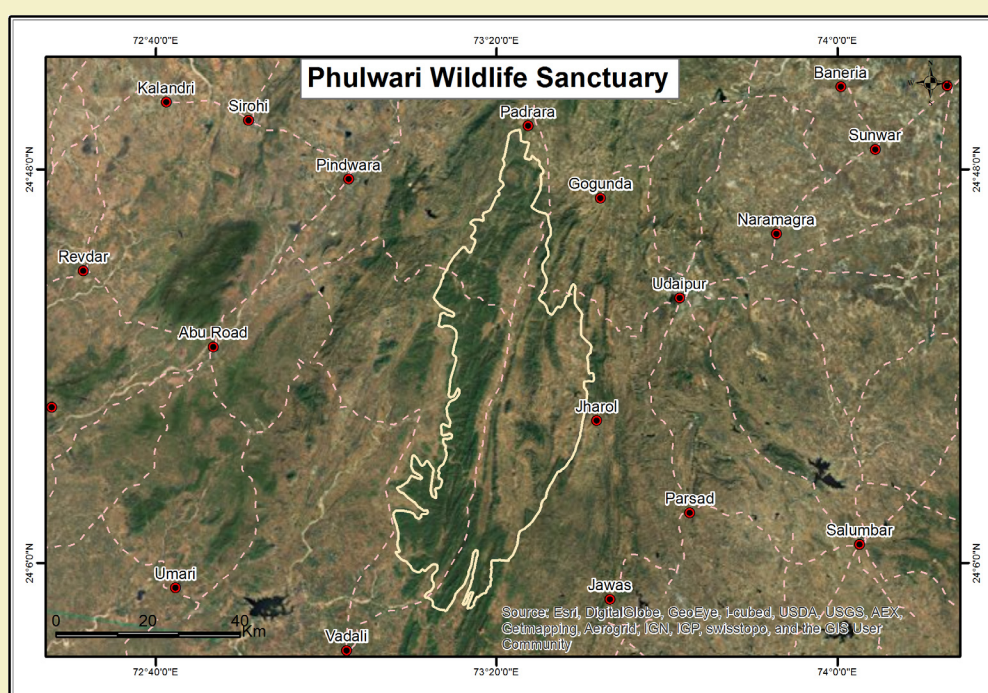
PHULWARI WILDLIFE SANCTUARY

IN-RJ-12

IBA Site	: IN-RJ-12	Area	: 51,141 ha
State	: Rajasthan	Altitude	: 219 msl
District	: Udaipur	Rainfall	: 650 mm
Coordinates	: 24° 22' 00" N, 73° 10' 00" E	Temperature	: 6 °C to 42 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Tropical Dry Deciduous Forest

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Wildlife Sanctuary, established in October 1983.



GENERAL DESCRIPTION

Phulwari or Phulwari ki Nal Wildlife Sanctuary is among the few sanctuaries in Rajasthan which have rich floral diversity. It abounds in flowering plants, shrubs, herbs, and climbers, hence the name *Phulwari*, i.e., the abode of flowers. This sanctuary is rich in tuberous plants too. As many as eight species of Orchids have been recorded from this sanctuary. This hunting ground of the erstwhile rulers of Bhomat, was declared as a sanctuary in 1983 in recognition of its biodiversity. It bears Tropical Dry Deciduous Forests with rich growth of Bamboo *Dendrocalamus strictus*. The area is mostly inhabited by Bhil, Meena, Garasiya, and Kathodia tribals, who still live in primitive conditions (Sharma 2007, 2014b).

Phulwari Sanctuary is situated in the Aravalli range in Udaipur district of Rajasthan, c. 123 km southwest of Udaipur. It is bordered by Gujarat state to the south and

southeast. The terrain is mainly hilly, with a network of streams and nullahs. The main river, Wakal, flowing southwards, divides the sanctuary into two and debouches into Sabarmati river in Gujarat state. The sanctuary can be approached by road from Udaipur and Ahmedabad, which are 123 km and 140 km away respectively.

The important woody vegetation along the watercourses in the sanctuary includes tall trees such as *Millettia pinnata*, *Madhuca indica*, *Terminalia arjuna*, *Syzygium heyneanum*, *Ficus bengalensis*, and *Phoenix sylvestris*. The upper and middle slopes of the hills bear *Terminalia tomentosa*, *Lannea coromandelica*, *Boswellia serrata*, *Wrightia tinctoria*, *Acacia catechoides*, *Anogeissus latifolia*, *Ziziphus xylopyrus*, and *Diospyros melanoxylon*.

Anogeissus sericea is dotted along valleys. *Tectona grandis* is present as climatic patches in various forest blocks of the sanctuary. Phulwari is a transition zone

between Mount Abu and Kumbhalgarh Sanctuaries (both IBAs) (Sharma 2014a). Many peninsular and Western Ghats floral and faunal species have their final distributional limits in and around Phulwari Sanctuary (Sharma 2007). The general biodiversity and ethnobiology of Phulwari Wildlife Sanctuary have been studied by Sharma (2007).

AVIFAUNA

Phulwari ki Nal is one of the most neglected sanctuaries of Rajasthan. Nevertheless, 227 bird species are reported from this site (Sharma 2002, 2007). Except for the two *Gyps* species of vultures classified as Critically Endangered, and Red-headed Vulture *Aegypius calvus* (BirdLife International 2014), and the Vulnerable Pied or White-naped Tit *Parus*

nuchalis, not many threatened bird species are found in Phulwari WLS, but the extant, albeit fragmented, forest harbours 30 out of 59 Biome 11 (Indo-Malayan Tropical Dry Zone) species. The sanctuary is a good example of the representative faunal diversity of the Aravalli Hills. It also harbours seven Near Threatened species in the waterbodies and streams, but their numbers are not significant. Amur Falcon *Falco amurensis* has been reported from this IBA (Sangha *et al.* 2006).

OTHER KEY FAUNA

The biodiversity of this sanctuary has been well studied, with numerous records of reptiles, amphibians, and mammals available (Sharma 1995a, 1997). The key reptilian species of the sanctuary are the Marsh Crocodile *Crocodylus palustris*, Monitor Lizard *Varanus bengalensis*, and Rock Python *Python molurus*. Among primates, Northern Plains Grey Langur *Semnopithecus entellus* is very common. Leopard *Panthera pardus*, Sloth Bear *Melursus ursinus*, Golden Jackal *Canis aureus*, Striped Hyaena *Hyaena hyaena*, Indian Fox *Vulpes bengalensis*, Elliot's Giant or Indian Giant Flying Squirrel *Petaurista philippensis*, and Wild Boar *Sus scrofa* are also encountered. Four-horned Antelope *Tetracerus quadricornis* is seen in the valleys near perennial water sources. Chundawat *et al.* (2002) and Koli *et al.* (2013) also reported Indian Giant Flying Squirrel *Petaurista philippensis*. Along with Sitamata WLS (an IBA), Phulwari is the westernmost limit of the distribution of this species in India. Similarly, Common Vine Snake *Ahaetulla nasuta* which is found throughout India, except in the northwest and much of the Gangetic basin (Whitaker & Captain 2004), has been reported by Sharma (1995b) from this IBA.

CRITICALLY ENDANGERED	
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
VULNERABLE	
Sarus Crane	<i>Grus antigone</i>
White-naped Tit	<i>Parus nuchalis</i>
NEAR THREATENED	
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Laggar Falcon	<i>Falco jugger</i>
Great Thick-knee	<i>Esacus recurvirostris</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupataria</i>
European Roller	<i>Coracias garrulus</i>
BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE	
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Rock Bush-quail	<i>Perdica argoondah</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-legged Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Brown-headed Barbet	<i>Megalaima zeylanica</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Indian Chat	<i>Cercomela fusca</i>
Tawny-bellied Babbler	<i>Dumetia hyperythra</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Grey-headed Starling	<i>Sturnus malabaricus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>
Ashy Woodswallow	<i>Artamus fuscus</i>

LAND USE

- Tourism and recreation
- Nature conservation and research
- Water management
- Plantation

THREATS AND CONSERVATION ISSUES

- Poaching
- Illegal felling of trees
- Human settlements
- Invasive species *Lantana camara*
- Encroachment
- Firewood collection
- Grazing
- Repeated drought
- Construction of dam
- Alteration of habitats
- Increasing network of road and electrical lines
- Excessive use of Wakal river water for irrigation using diesel pump sets

Due to the village settlements situated inside and adjacent to the sanctuary, activities such as collection of firewood, illegal felling of trees, and poaching of animals including birds are known to occur. The Kathodias (also known as ‘Monkey-eating Tribe’) use traditional techniques for trapping and killing of wildlife, especially monkeys. Strict patrolling and awareness campaigns are required to check such activities. As many as 134 villages are present inside the sanctuary. By translocating a few villages, the biodiversity of sanctuary can be saved.

Damming of the Mansi-Wakal river is complete, which

Chundawat, P.S., Sharma, S.K., and Solanki, H.S. (2002) Occurrence of the Large Brown Flying Squirrel (*Petaurista petaurista philippensis*) in Phulwari Wildlife Sanctuary, Rajasthan. *Zoo's Print Journal* 17(11): 941.

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Phulwari Ki Naal has characteristic geological features as shown above



Wakal river bisect the sanctuary and provide much - needed water to wildlife during summer

will affect the downstream hydrology in the long run. Check on the continuity of water flow will cause significant destruction of the habitats along the river banks. This will, in turn, affect the faunal and floral diversity. The site has rich flora, with dense vegetational cover in the core area. Field surveys should be undertaken to document the fauna. The Department of Forests (Wildlife Division) is conducting eco-trekking and camping for tourists to sensitize them, and to create awareness of the necessity for protecting the sanctuary.

KEY CONTRIBUTOR

Satish K. Sharma

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RAM SAGAR LAKE (HINDOLI)

IBA Site Code : IN-RJ-13

State : Rajasthan

District : Bundi

Coordinates : 25° 36' 00" N,
75° 02' 60" E

Ownership : State

Area : 400 ha

Altitude : 295 msl

Rainfall : 900 mm

Temperature : 10 °C to 43 °C

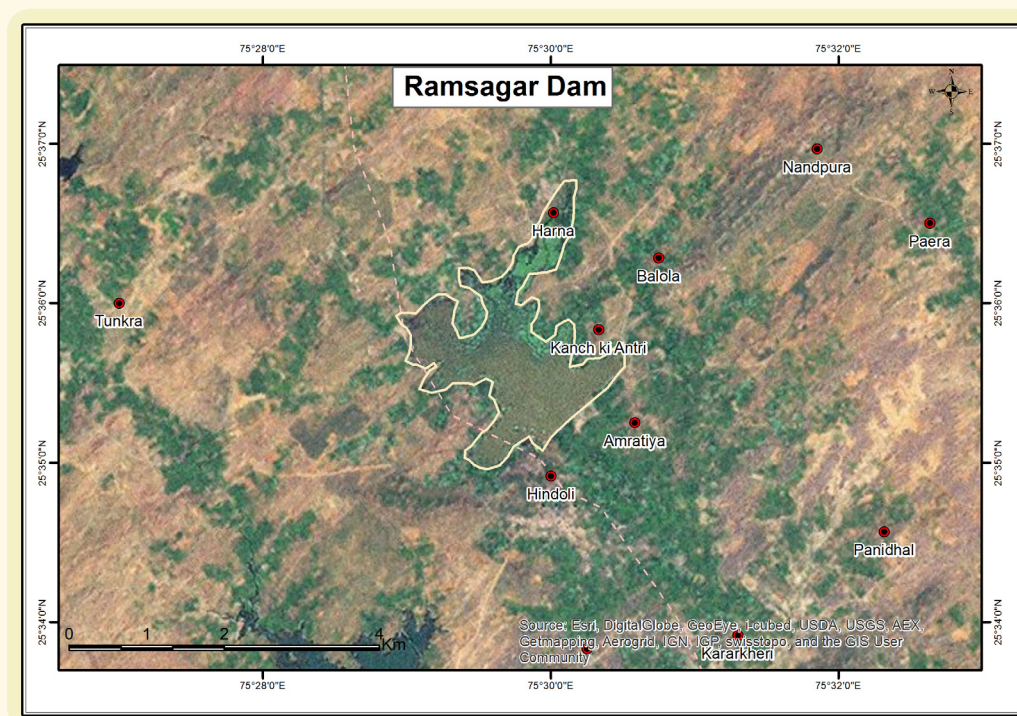
Biogeographic Zone : Semi-arid

Habitat : Freshwater Reservoir

IN-RJ-13

IBA CRITERIA: A1 (Threatened species), A4iii (≥20,000 waterbirds)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

Ram Sagar Lake is located c. 24 km north of Bundi and 170 km south of Jaipur. It is an irrigation tank which waters agricultural land in the surrounding areas through canal systems. The lake was constructed by the erstwhile Maharaja of Bundi. More than 10,000 waterfowl are recorded here during winter. Many pairs of Sarus Crane *Grus antigone* use the surrounding areas for breeding. In a survey during February 2002, 8,000–10,000 waterfowl and two pairs of Sarus raising their chicks were recorded (Kulshreshtra, *in litt.* 2002). We do not know the present population of waterfowl and Sarus.

Submerged vegetation covers 75% of the wetland, the dominant species being *Najas graminea*, *N. minor*, *Hydrilla verticillata*, and *Vallisneria natans*. Only 25 % of the area has emergent vegetation, which is found near the

periphery of the wetland. The species are mainly *Ipomoea carnea* and *I. aquatica*. Floating vegetation occurs in 25% of the area. The major species are *Nymphoides cristatum*, *Nymphaea pubescens* and *N. indica*, *Eichhornia crassipes*, and *Cladophora*. Lotus is commercially grown in the lake.

Ram Sagar was proposed as a potential Ramsar Site as it meets Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies), and for its high ecological values (Islam & Rahmani 2008).

AVIFAUNA

Ram Sagar (Hindoli) is one of the most important wetlands in the semi-arid Bundi district. However, during



Although waterfowl numbers in Ram Sagar has decreased during the ten years, with better protection by the forest department the population can increase. A small number of Sarus Crane *Grus antigone* breeds in the area

the last few years, waterfowl numbers have declined from more than 20,000 to 8,000–10,000 due to scanty rainfall. During years of normal rainfall, when the waterspread is extensive and shallow areas become available at the fringes, earlier up to 10 pairs of Sarus have been observed by the local people. We have included it in the IBA list due to its great potential to attract more than 20,000 waterfowl, and because it is a nesting site for the globally Threatened Sarus Crane. The Lake falls in Biome 11 (Indo-Malayan Tropical Dry Zone).

OTHER KEY FAUNA

At Ram Sagar (Hindoli) Lake, 13 commercially valuable species of fish were recorded from the reservoir (Kulshreshtha 2002). Leopard *Panthera pardus*, Nilgai *Boselaphus tragocamelus*, Small Indian Civet *Viverricula indica*, and Jungle Cat *Felis chaus* are found among the mammalian fauna.

LANDUSE

- Irrigation
- Fishing

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>

VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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THREATS AND CONSERVATION ISSUES

- Agriculture
- Mining
- Pollution by pesticides
- Encroachment
- Eutrophication

This wetland is commonly used for agriculture, irrigation, drinking and wallowing by cattle, and clay gathering. People use the lake for a variety of agricultural purposes, for which it is also being reclaimed. Villagers often disturb wintering flocks of waterfowl. Overuse of water for agriculture, use of pesticides, encroachment in the lake by local villagers, reduction in water level, and eutrophication are all associated problems.

KEY CONTRIBUTORS

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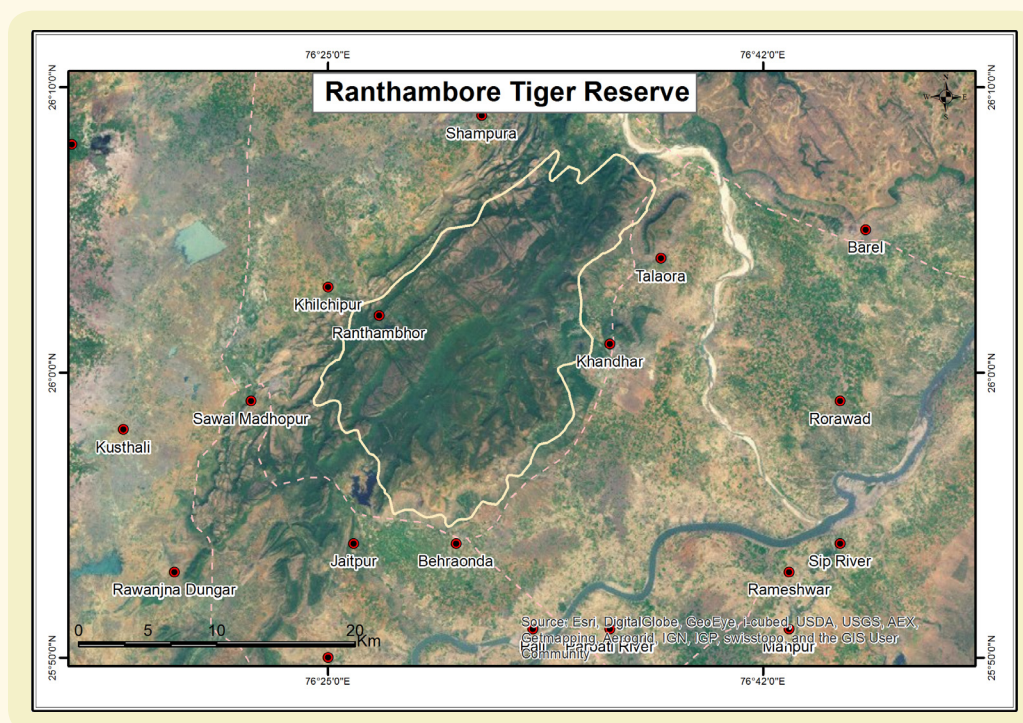
RANTHAMBHORE TIGER RESERVE

IBA Site Code :	IN-RJ-14	Area :	1,473.554 sq. km
State :	Rajasthan	Altitude :	215–500 msl
District :	Sawai Madhopur, Karauli and Bundi	Rainfall :	800 mm
Coordinates :	25° 41' N to 26° 22' N, 76° 16' E to 77° 14' E	Temperature :	2 °C to 49 °C
Ownership :	State	Biogeographic Zone :	Semi-arid
		Habitat :	Tropical Dry Deciduous Forest

IN-RJ-14

IBA CRITERIA: A1(Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Sawai Madhopur Game Sanctuary, in 1955. Tiger Reserve, established in 1973. National Park, established in 1980.



GENERAL DESCRIPTION

Ranthambhore was established as the Sawai Madhopur Game Sanctuary in 1955 by the Government of India and was declared as a Tiger Reserve in 1973. Ranthambhore became a National Park in 1980. In 1984, the adjacent forests were declared the Sawai Man Singh Sanctuary and Kailadevi Sanctuary, and in 1991, Ranthambhore Tiger Reserve was enlarged to include the Sawai Man Singh and Kailadevi Sanctuaries.

Ranthambhore Tiger Reserve lies from latitudes 25° 41' N to 26° 22' N, and from longitudes 76° 16' E to 77° 14' E. The reserve is situated in the southeastern part of Rajasthan and spreads over three districts namely Sawai Madhopur, Karauli, and Bundi. On the eastern side of the reserve flows the mighty River Chambal. Another river, Banas divides the reserve into two parts, the northeastern part being Kailadevi

WLS, which is part of the reserve.

The total area of Ranthambhore Tiger Reserve is 1,473.55 sq. km, of which 1,113.36 sq. km has been notified as critical tiger habitat in the official gazette of the state vide notification No. F.3 (34) forest / 2007 dated December 28, 2007. The remaining 360.19 sq. km of Ranthambhore TR serves as a buffer area.

Ranthambore NP, situated at the junction of the Aravalli and Vindhyachal Ranges, is a unique combination of natural and historical richness, standing out conspicuously in a vast arid and denuded tract of eastern Rajasthan. Ranthambore is c. 14 km from the town of Sawai Madhopur (Monga 2002).

Ranthambore ranges over high undulating topography, from flat topped hills (Indala, Doodh-Bhat, and Chirol) to conical hillocks and sharp ridges, from wide, flat valleys

CRITICALLY ENDANGERED

Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>

VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Eastern Imperial-eagle	<i>Aquila heliaca</i>
White-browed Bushchat	<i>Saxicola macrorhyncha</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Eurasian Curlew	<i>Numenius arquata</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-headed Vulture	<i>Aegypius calvus</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Jungle Bush-quail	<i>Perdicula asiatica</i>
Painted Bush-quail	<i>Perdicula erythrorhyncha</i>
Painted Spurfowl	<i>Galloperdix lunulata</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-wattled Lapwing	<i>Vanellus malarbaricus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Sirkeer Malkoha	<i>Phaenicophaeus leschenaultii</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyroceros birostris</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Indian Lark	<i>Mirafra erythroptera</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>
Black-headed Cuckoo-shrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
White-bellied Minivet	<i>Pericrocotus erythropygius</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Marshall's Iora	<i>Aegithina nigrolutea</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Indian Chat	<i>Cercomela fusca</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Rufous-fronted Prinia	<i>Prinia buchanani</i>
Ashy Prinia	<i>Prinia socialis</i>
Jungle Prinia	<i>Prinia sylvatica</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>

(Lahpur, Nalghati, Khachida, Anantpur) to narrow, rocky gorges (Sharma 2000).

Inside the core area are a few natural ponds and depressions, notable among them being Man Sagar, Lahpur

Pond, Milak Talao near Jogi Mahal, and Galai Sagar near Khandar. There are remnants of old villages like Anantpur, Chiroli, Kachida, and Bherda in the north, Lakarda and Lahpur in the centre, and Guda in the south. The ruins of old buildings and the shikargahs (hunting grounds) of the Maharajas of erstwhile Jaipur State still exist.

Two protected areas, Kailadevi WLS and Sawai Mansingh WLS, are linked by narrow corridors to the core of Ranthambhore NP, and all these together comprise the Tiger Reserve.

The terrain of Sawai Mansingh WLS is flat and rocky, and the Devpura Dam within is a useful source of water for wildlife, providing good habitats for aquatic flora and fauna, especially for migratory waterbirds.

Kailadevi WLS is the northern extension of Ranthambhore NP in Karauli and Sawai Madhopur districts. The sanctuary is bound to the west by the River Banas and to the south by the River Chambal. The forest cover is fairly sparse and spread out. The main flora of the site are *Anogeissus pendula* mixed with *Acacia catechuoides*, *Acacia leucophloea*, *Dichrostachys cinerea*, *Ficus religiosa*, *F. bengalensis*, *F. glomerata*, *Cassia fistula*, *Albizia lebbeck*, and *Diospyros melanoxylon*.

AVIFAUNA

Ranthambhore is world famous for its Tiger *Panthera tigris*, but few people know that it has rich birdlife as well. The Tropical Dry Deciduous Forest and wetlands support nearly 272 bird species (Chowdhary 2000). Sarus Crane *Grus antigone*, Eastern Imperial-eagle *Aquila heliaca*, White-rumped Vulture *Gyps bengalensis*, Long-billed Vulture *Gyps indicus*, Lesser Adjutant *Leptoptilos javanicus*, and White-browed (Stoliczka's) Bushchat *Saxicola macrorhyncha* are among the threatened species found here. Many Near Threatened species are also found in the wetlands. The site qualifies as Biome 11 (Indo-Malayan Tropical Dry Zone) and harbours species of this biome. BirdLife International (undated) has listed 59 species under Biome 11, of which 33 have been seen in Ranthambhore. This IBA holds some of the best biome-restricted bird assemblages of Tropical Dry Deciduous Forest in India.

During winter, the wetland of Ranthambhore hosts 30–40 Black Stork *Ciconia nigra* and is probably the best area in northwest India to see this species.

OTHER KEY FAUNA

Ranthambhore National Park is justifiably famous for Tiger *Panthera tigris*. In 2013, the area had over 50 tigers. The other predators include Leopard *P. pardus*, Caracal *Caracal caracal*, Ratel or Honey Badger *Mellivora capensis*, Jungle Cat *Felis chaus*, Sloth Bear *Melursus ursinus*, Wild Boar *Sus scrofa*, Golden Jackal *Canis aureus*, Striped Hyena *Hyaena hyaena*, and Red Fox *Vulpes vulpes*. The

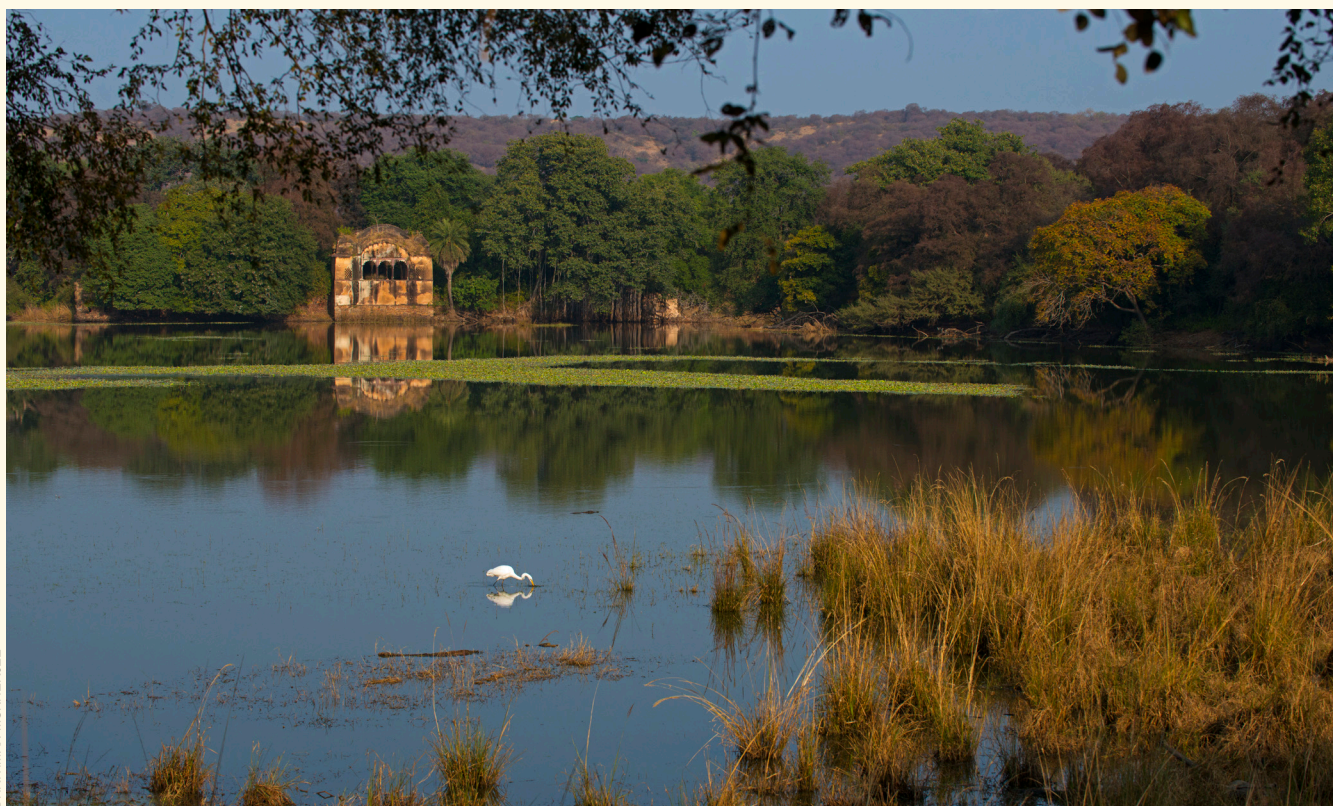


ASAD R. RAHMANI

Ranthambhore is one of the top most wildlife tourist areas in India, thanks to easy sighting of Tigers (below) and other wildlife. Not many people know that 272 bird species have been identified till now including many globally threatened species



ASAD R. RAHMANI



Milak Talao near Jogi Mahal in Ranthambhore

herbivores comprise Cheetal *Axis axis*, Sambar *Rucervus unicolor*, Nilgai *Boselaphus tragocamelus*, Chinkara *Gazella bennettii*, and Northern Plains Langur *Simnopithecus entellus*. Chaudhary (1997) has listed Long-eared Hedgehog *Hemiechinus auritus*, Musk Shrew *Suncus murinus*, Marsh Crocodile *Crocodylus palustris*, and Common Indian Monitor *Varanus bengalensis* in the fauna of Ranthambhore.

LAND USE

- Nature conservation and research
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Poaching
- Tourism
- Straying of big cats into human habitation
- Encroachments
- Invasive exotic species e.g., *Prosopis juliflora*

According to Jain (2001), there are 332 villages in and around Ranthambhore Tiger Reserve within a five km radius. There are 143,468 cattle and c.100,000 people in these villages. They put enormous pressure on the park and the sanctuary. Illegal grazing is a constant problem which the forest guards have to deal with, almost on a daily basis, at the boundaries of the park. As Ranthambhore is easily

accessible and made famous by celebrity visits, there is also tremendous tourist pressure.

Due to increase in tiger numbers, incidents of territorial fights among tigers and their straying into human habitation is on the rise. Consequently in 2013, the National Tiger Conservation Authority approved the relocation of 24 villages, to create a corridor connecting Ranthambhore with Kaila Devi WLS and Sawai Mansingh WLS. This is also expected to reduce the possibility of poaching.

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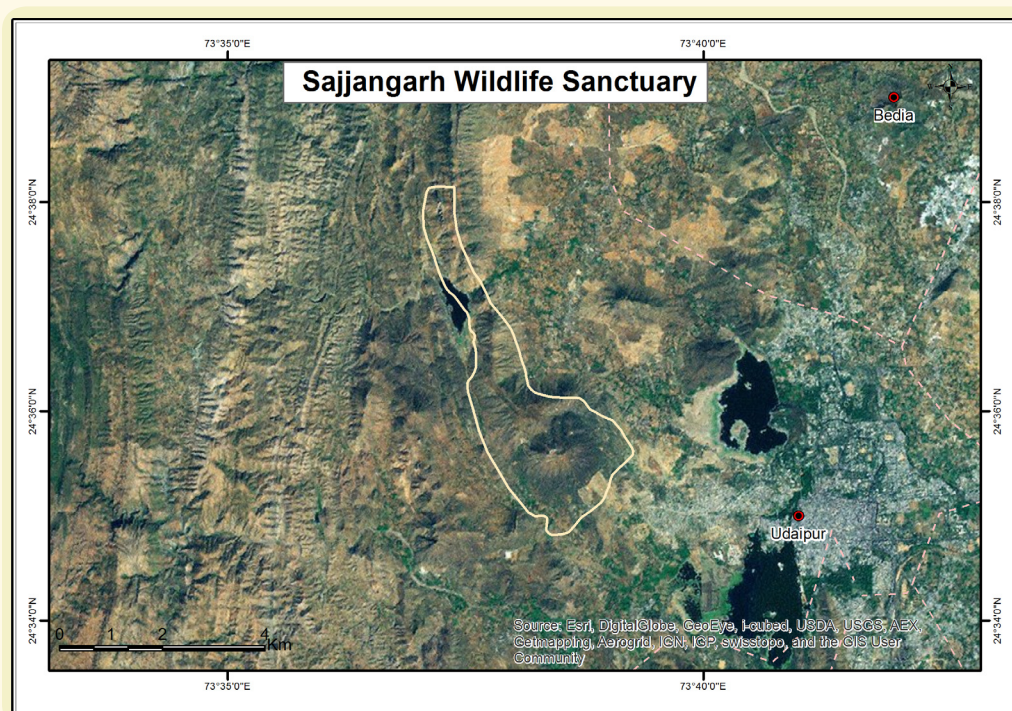
SAJJANGARH WILDLIFE SANCTUARY

IN-RJ-15

IBA Site Code	: IN-RJ-15	Area	: 519 ha
State	: Rajasthan	Altitude	: 936 msl
District	: Udaipur	Rainfall	: 650 mm
Coordinates	: 24° 38' 00" N, 73° 39' 15" E	Temperature	: 4 °C to 42 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Tropical Dry Deciduous Forest

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Wildlife Sanctuary, established in February 1987.



GENERAL DESCRIPTION

Sajjangarh Wildlife Sanctuary is located within the environs of Udaipur City. It is situated around Sajjangarh Fort, built in 1874 by Maharana Sajjan Singh of Mewar, on Bansdara Hill, which is 936 msl. The sanctuary lies 5 km from the centre of Udaipur City on its western boundary. Once a dense forest holding a large variety of wild fauna, it lost its forest cover due to biotic pressure. After declaration as a protected area in 1987, it has started to regain its vegetational cover. Thus, it is a unique example of habitat revival and restoration. Apart from improving the watershed of Ahar river, notification of the sanctuary has also resulted in improved ground water and clean surface water in the famous Pichola and Fatehsagar Lakes. Sajjangarh was famous for tigers, but the last tiger was seen in 1956 (Sharma 1998).

Bari Lake, popularly known as Tiger Lake, is situated on the western slope of the sanctuary. The clean water of this deep lake provides ideal habitats for aquatic fauna and flora.

The flora of the sanctuary is a typical representation of Aravalli vegetation, with the dominant species of *Anogeissus pendula*, *A. latifolia*, and *Boswellia serrata*. Besides, the sanctuary also bears scrub forest with the dominant species of *Acacia leucophloea* and *Ziziphus* spp. Guggul *Commiphora wightii* (a threatened species), Negar *Vitex negundo*, and Vajradanti *Barleria* spp. are the important medicinal plants present in the sanctuary.

AVIFAUNA

Sajjangarh Wildlife Sanctuary and its surrounding area is rich in biodiversity (Bhatnagar *et al.* 2007; Sharma 1998,

1999, 2002; Sharma 2007; Sharma & Tehsin 1994; Sharma & Koli 2014; Tehsin & Lokhandwala 1982; Mehra 2004). In the scrub forest region of the sanctuary, White-naped Tit *Parus nuchalis* can be seen easily (Sharma 2002, Sharma & Koli 2014). More than 130 bird species have been reported from the site (Sharma 1998, 2002). The site lies in Biome 11 (Indo-Malayan Tropical Dry Zone) and harbours 31 species of this biome. BirdLife International (undated) has listed 59 species in Biome 11, so more than half are found at this site. Thus, this site easily qualifies for A3 criteria.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

VULNERABLE

White-naped Tit	<i>Parus nuchalis</i>
Green Munia	<i>Amandava formosa</i>

NEAR THREATENED

Red-headed Falcon	<i>Falco chicquera</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-naped Ibis	<i>Pseudibis papillosa</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Red-necked Falcon	<i>Falco chicquera</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Rock Bush-quail	<i>Perdica argoondah</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrceros birostris</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Indian Lark	<i>Mirafra erythroptera</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
White-throated Babbler	<i>Dumetia hyperythra</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Indian Chat	<i>Cercomela fusca</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail	<i>Rhipidura aureola</i>
White-naped Tit	<i>Parus nuchalis</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>

The site is important due to the presence of nests of Long-billed Vulture *Gyps indicus* on the rocky cliffs. Most of the other vulture species are now gone or are extremely rare, except perhaps for the Egyptian Vulture *Neophron percnopterus* that is still seen sauntering around villages in the vicinity of this IBA. A cattle carcass may bring an occasional White-rumped *Gyps bengalensis* or a few Long-billed *G. indicus* Vultures from the nearby breeding colony, otherwise these carcasses are now mostly eaten by stray dogs.

OTHER KEY FAUNA

This small sanctuary bordering urban areas supports mammals such as Leopard *Panthera pardus*, Jungle Cat *Felis chaus*, Indian Palm Civet *Paradoxurus hermaphroditus*, Sambar *Rucervus unicolor*, Spotted Deer *Axis axis*, Indian Pangolin *Manis crassicaudata*, Northern Plains Langur *Semnopithecus entellus*, Indian Crested Porcupine *Hystrix indica*, Striped Hyaena *Hyaena hyaena*, Indian Fox *Vulpes bengalensis*, Golden Jackal *Canis aureus*, Ruddy Mongoose *Herpestes smithi*, and Small Indian Civet *Viverricula indica*. Rusty-spotted Cat *Prionailurus rubiginosus*, the smallest lesser cat in India, is also present in and around Sajjangarh WLS. The reptilian fauna is represented by the Indian Starred Tortoise *Geochelone elegans*, Common Indian Monitor *Varanus bengalensis*, and many snakes (Sharma 1999).

LAND USE

- Tourism and recreation
- Nature conservation and research
- Forestry

THREATS AND CONSERVATION ISSUES

- Erosion
- Collection of firewood
- Easy access to the sanctuary
- Man-animal conflict
- Overgrazing

Sajjangarh is located within the limits of Udaipur city, therefore it is easily accessible, leading to illegal collection of firewood and livestock grazing. Forest fires are started by local residents to encourage grass growth. Also, there is the problem of man-animal conflict. The wild cats kill livestock from the villages nearby. Though the Forest Department has taken important preventive measures, awareness among the people residing around the site is still needed for better implementation of these measures.

The Forest Department (Wildlife Division) has organized several awareness camps for the locals to protect the site from illegal activities and to safeguard the nesting sites of *Gyps* spp. Trekking and nature camps for school children are being conducted by the Forest Department. Many



ASAD R. RAHMANI

Sajjangarh Wildlife Sanctuary is located near Udaipur city as typical flora of the Aravallis. White-naped Tit *Parus nuchalis* and Green Munia *Amandava formosa*, both Vulnerable are found in this IBA

nature education trails have been developed by the Forest Department for nature education. A Biological Park has been developed close to Sajjangarh Sanctuary, which is a new ecotourist destination in southern Rajasthan.

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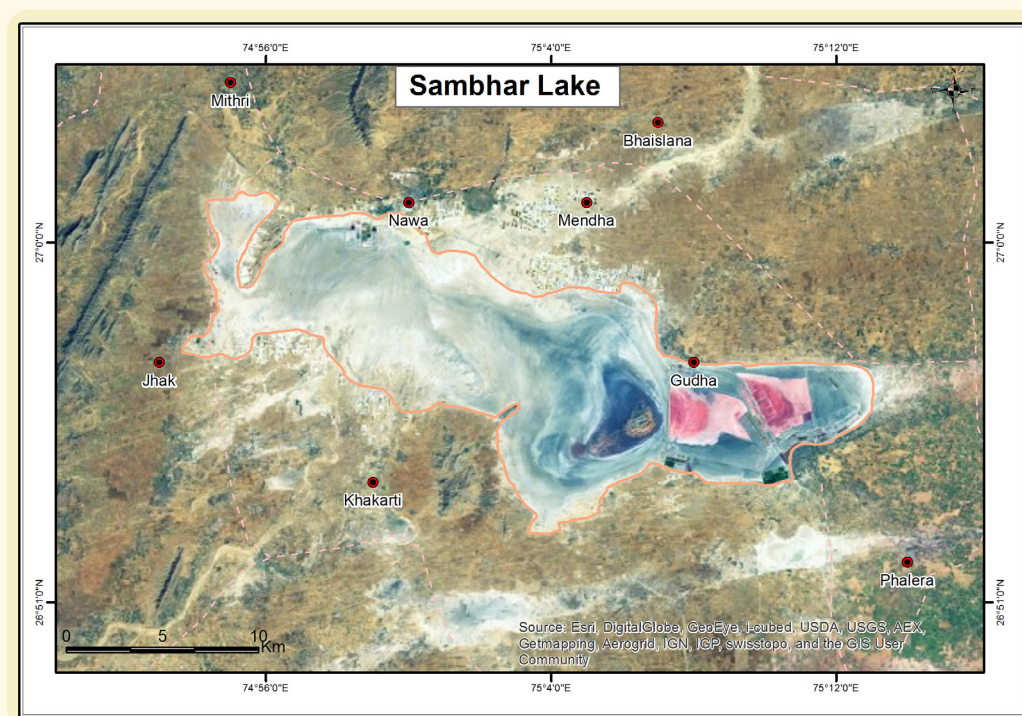
SAMBHAR LAKE

IN-RJ-16

IBA Site Code	: IN-RJ-16	Area	: 19,000 ha
State	: Rajasthan	Altitude	: 360 msl
District	: Nagaur, Jaipur, Ajmer	Rainfall	: 540 mm
Coordinates	: 26° 56' 60" N, 75° 04' 00" E	Temperature	: 10 °C to 33 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Swamp

IBA CRITERIA: A1 (Threatened species), A4i (1% of biogeographic population), A4iii (≥20,000 waterbirds)

PROTECTION STATUS: Not officially protected. Declared a Ramsar site on March 23 1990.



GENERAL DESCRIPTION

Sambhar is a large, shallow saline lake, only about 3 m at its deepest. The maximum length of the lake basin is 22.5 km, while the width ranges from 3.2 km to 11.2 km. The lake bed (360msl) is almost flat.

The lake basin is divided into two unequal parts by a 5.16 km long dam between the settlements of Jhapok to the south and Gudha to the north. The western part is a natural, undisturbed, continuous sheet of water. The eastern part, which is used exclusively for salt extraction, covers 76.8 sq. km and comprises two large reservoirs for holding brine, with a series of canals and salt pans. The pans can be approached by the narrow bunds that separate them. After the brine reaches a certain level of concentration, it is transferred from the western part of the lake to the reservoirs through two sluice gates in the dam (Gopal & Sharma 1994).

Semi-arid and arid vegetation and important tree species with xeric characteristics are found around the lake. Important shrubs are *Salvadora oleoides* and *S. persica*.

Sambhar Lake is a Ramsar Site as it meets Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies), and for its high ecological values (Islam & Rahmani 2008).

AVIFAUNA

Sambhar Lake supports a large population of avifauna, especially Greater *Phoenicopterus roseus* and Lesser *Phoeniconaias minor* flamingos. Recent reports suggest



ASIF N. KHAN

About 45 species of aquatic birds have been recorded from the Sambhar Lake and nearby wetlands

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Sociable Lapwing	<i>Vanellus gregarius</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Dalmatian Pelican	<i>Pelecanus crispus</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Greater Adjutant	<i>Leptoptilos dubius</i>
Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Sarus Crane	<i>Grus antigone</i>
Macqueen's Bustard	<i>Chlamydotis undulata</i>
White-naped Tit	<i>Parus nuchalis</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Pallid Harrier	<i>Circus macrourus</i>
Red-headed Falcon	<i>Falco chicquera</i>
Laggar Falcon	<i>Falco jugger</i>
Great Thick-knee	<i>Esacus recurvirostris</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
European Roller	<i>Coracias garrulus</i>

that more Lesser Flamingo *P. minor* are arriving and their numbers vary between 8,000 and 20,000. Greater Flamingo *Phoenicopterus roseus* also arrive in numbers ranging from 5000 to 10,000. About 45 species of aquatic birds (including ducks, geese, and shorebirds) have been recorded from the lake and its surroundings.

Sangha (2008) gave information about the number of Lesser Flamingos seen here. He found more than 20,000 birds on September 23, 1995. From early January to March 1996, he estimated c. 18,000 individuals. In August 1998, he observed more than 7,000 flamingos. On September 19, 2001, he found 20,000 birds including 10,000 Lesser and 5,000 Greater Flamingos. On January 4, 2009 he estimated c. 15,000 flamingos. However, he mentions that, despite the claims of Kumar & Bhargava (1996, 1998), there is no evidence of breeding of Lesser or Greater Flamingos here. He also mentions that the population estimation of 100,000 Lesser Flamingos by scientists of Zoological Survey of India (Anon. 2005) cannot be true.

In 2014, more than 10,000 flamingos (Greater and Lesser) were estimated in the lake and surrounding wetlands, besides total 52 species of waterbirds (Tarun K. Roy, *pers. comm.* 2014).

Sangha (2008) reported the sighting of a single Sociable Lapwing *Vanellus gregarius* at Nimaj, Pali on March 3, 2008 about which he was informed by a birder Sumendra Singh.

The flamingos have been a regular visitor for several decades. Agarwal (1951) reported that soon after the rains, as the lake is filled, “thousands of birds, flamingos and ducks descend on the lake and feed on innumerable insects and small animals that develop in water.” The number of flamingos visiting the lake varies considerably, depending upon the timing and amount of rainfall. Both Greater and Lesser Flamingo occur, the former greatly outnumbering the latter. In dry years, the population of migratory birds as well as of resident birds is very low. After a good monsoon in 1982, Prakash Gole (*pers. comm.*) observed an estimated population of 50,000 flamingos and 200 pelicans (probably Great White Pelican *Pelecanus onocrotalus*), besides many other waterfowl species. However, he did not find any flamingos in the winter of 1984. During surveys conducted in 1992–1993, it was estimated that the lake attracted a population of about 5,000 flamingos (mostly in the salt pans), and an approximately equal number of other waterfowl species, including many Near Threatened species.

OTHER KEY FAUNA

Nilgai *Boselaphus tragocamelus* and Golden Jackal *Canis aureus* are the common mammals found in this IBA.

LAND USE

- Water management
- Nature conservation and research
- Salt industries (now increased)

THREATS AND CONSERVATION ISSUES

Kulshreshtha *et al.* (2013) list the major threats to the already diminishing ecology of the lake:

1. Shrinkage of waterspread: Considerable reduction in the waterspread of the lake has been caused by the formation of large number of anicuts on inflowing rivers by the state irrigation department.

2. Siltation and disturbances in the lake bed: The main lake bed has been ruthlessly exploited to procure soil by the villagers, in the southwest part towards Nawa in Nagour district. Due to change in the nature of lake bed, a large amount of silt flows into the lake and gets deposited at the bottom. It reduces the brine level and groundwater level, causing shrinkage of the lake size and capacity. Trespassing of vehicles through the lake further complicates the problem.

3. Excessive resource utilization: Since no license is required for salt extraction, the lake has been pushed to produce as much as 20 times more salt than it should produce annually. In addition, illegal manufacturers of salt steal brine via underground pipes by employing turbines. It is estimated that Sambhar Salts Ltd, Rajasthan extracted 50,000 tons of salt in 2008, compared to private manufacturers, who extracted 2.8 million tons.

4. Altered land use pattern: Eroded land of the Sambhar catchment area has increased during the past seven years since agricultural land is also being used illegally for salt extraction. This has intensified the process of desertification in the entire area.



ASAD R. RAHMANI

Sambhar is famous for Greater and Lesser flamingos

5. Deforestation: Forest cover is mostly confined to the dissected rocky and hilly areas in a much degraded form. Overgrazing and large-scale tree cutting of the residual dry forest of *Acacia* and *Prosopis* in the watershed have further led to siltation and sedimentation of the lake. Human settlements of Sambhar and Phulera towns are also fast expanding, and urbanization on a large scale is resulting in a considerably thin forest cover.

6. Anthropogenic activities: The most devastating anthropogenic action has been the construction of the 12.4 km long road from Nawa to Khakarkhi village near Korsina to the southwest of the lake, dividing the lake into two unequal parts. This may severely affect the population of the avifauna and diminish the status of the Ramsar Site. Tourists also cause a lot of disturbance to the birds. Poaching of birds, including flamingos, continues unabated. The periphery of the nearby Phulera Lake (which has not seen having water during the last five to six years) is being encroached upon by land mafia.

Conservation efforts by the Government: Sambhar Lake was chosen as one of the 11 lakes under the National Lake Conservation Programme (NLCP) for the conservation and beautification of wetlands within the 11th Five Year Plan of the Government of India. Sambhar Wetland Conservation Project, completed during 2001–2005 by the Forests and Wildlife department of Government of Rajasthan, ended with the expenditure of a huge sum of money but without any improvement in the ecology of the lake.

Recommendations for the Conservation of Sambhar Salt Lake: Kulshreshtha *et al.* (2013) and Kumar (1996) have offered the following practical and cost-effective alternatives:

1. The conservation planning of the lake has to be done in a carefully planned and phased manner with feedback from experts in which immediate eco-sensitive priority areas shall be categorized. The first priority for conservation should be given to the areas which are worst affected and need immediate attention. The main lake (waterfowl habitat), marshy areas of the lake, dried and cracked bed, and basin of the lake fall in this category. The second preference should be given to the periphery of the lake, where human activities are a peak which needs to be strictly prohibited

in the priority eco-sensitive zones by the government and other responsible stakeholders.

2. The watershed area which has many satellite freshwater spots (namely Naliasar water pond, Korsina pond, and Gudha pond) used by the villagers and is home to a variety of geese, duck, Common Crane, and pelican should be conserved both for human beings and birds.

3. The lake needs more effective protective coverage under the Wildlife (Protection) Act 1972 or further legal framework under the MoEF and State Forest Department to restrict the agencies degrading the wetland (Kumar 1996).

4. Afforestation of the border areas of the lake by salt tolerant species to create a buffer zone for protection of avifauna (Kumar 1996).

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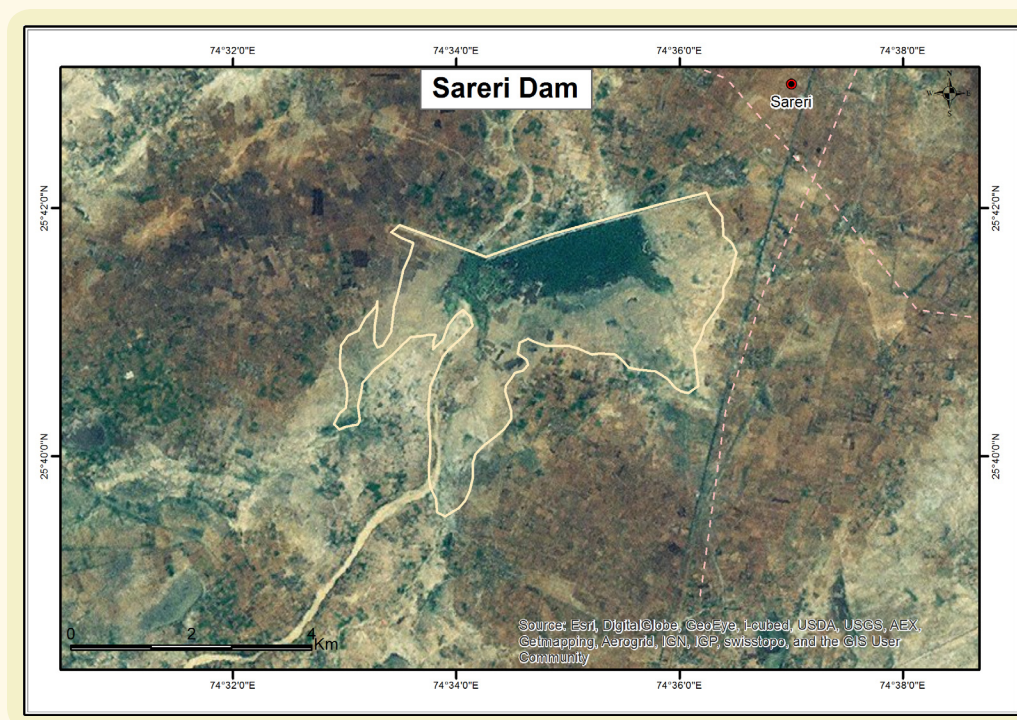
SARERI (BANDH) DAM

IN-RJ-17

IBA Site Code	: IN-RJ-17	Area	: 300 ha
State	: Rajasthan	Altitude	: 380 msl
District	: Bhilwara	Rainfall	: 700 mm
Coordinates	: 25° 42' 23" N, 75° 38' 26" E	Temperature	: 7 °C to 45 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Swamp

IBA CRITERIA: A1 (Threatened species) A4iii (≥20,000 waterbirds)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

Sareri Dam was built by the Department of Irrigation in 1957 on Mansi river, c. 24 km north of Bundi. The water from the reservoir is used for irrigating agricultural fields in the surrounding areas through a system of canals (Kulshreshtha 2000). Eight to ten thousand waterfowl come to this wetland during winter. Many pairs of Sarus Crane *Grus antigone* use the habitat around the lake for breeding. In February 2002, Manoj Kulshreshtha, State Coordinator of IBCN, during Wetland Surveys of Rajasthan, found 8,000–10,000 waterfowl on the lake. Due to scanty rainfall in 2002, this lake was reduced to one-fourth of its total capacity. During normal rains when the waterspread is more, there could be more than 20,000 waterfowl (M. Kulshreshtha, pers. comm. 2002).

Lotus *Nelumbo nucifera* is commercially grown in the lake. The surrounding area is under agriculture and bears *Acacia* and some planted trees.

Sareri Bandh was proposed as a potential Ramsar Site as it meets Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies), and for its high ecological values (Islam & Rahmani 2008).

AVIFAUNA

Sarus Crane *Grus antigone* was among the 26 species recorded from the lake and its catchment area. The dominant birds were Ruddy Shelduck *Tadorna ferruginea*, Eurasian Coot *Fulica atra*, Black-winged Stilt *Himantopus himantopus*, and Bar-headed Goose *Anser indicus*. The lake is important for its congregations of waterfowl. Since the last 8-10 years the water level of the lake is reduced, so that smaller numbers of migratory birds are visiting it.

DHIRTIMAN MUKHERJEE



Globally Threatened Sarus Crane breeds in and around Sareri dam

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>

VULNERABLE

Dalmatian Pelican	<i>Pelecanus crispus</i>
Sarus Crane	<i>Grus antigone</i>

NEAR THREATENED

River Lapwing	<i>Vanellus duvaucelii</i>
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People have seen up to 10 pairs of Sarus Cranes here (M. Kulshreshtha, pers. comm. 2002). The dam also attracts more than 100 Ruddy Shelduck *Tadorna ferruginea*, 300 Demoiselle Crane *Grus virgo*, River Lapwing *Vanellus duvaucelii*, and Dalmatian Pelican *Pelecanus crispus* in large numbers during winter.

With the data available, the site does not qualify as an IBA but it has great potential to be developed as an excellent waterfowl refuge if the waterspread is maintained and poaching is controlled. Secondly, the globally Threatened Sarus Crane breeds here (three to four breeding pairs). Therefore, we have listed it as an IBA.

OTHER KEY FAUNA

Not much is known about the aquatic fauna, but four species of fishes were identified during a short visit: *Esomus* sp., *Heteropneustes fossilis*, *Puntius sophore*, and *P. ticto*.

LAND USE

- Fisheries

THREATS AND CONSERVATION ISSUES

- Agriculture
- Pollution by pesticides
- Encroachment
- Eutrophication

Overuse of water for agriculture, use of pesticides, encroachment in the lake by the local villagers, reduction in water level, and eutrophication are the major conservation issues. This wetland is commonly used for agriculture, fishing, and drinking/wallowing by cattle, and clay gathering. Agricultural practices were observed in the dried up area of the dam.

Detailed studies on the avifauna, especially on Sarus Crane are required urgently. Conservation awareness amongst the villagers and decision makers would help in making Sareri Dam an excellent waterfowl refuge.

KEY CONTRIBUTOR

Manoj Kulshreshtha

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SARISKA TIGER RESERVE

IN-RJ-18

IBA Site Code : IN-RJ-18

State : Rajasthan

District : Alwar

Coordinates : 27° 25' 46" N, 76° 27' 49" E

Ownership : State

Area : 86,600 ha

Altitude : 400–777 msl

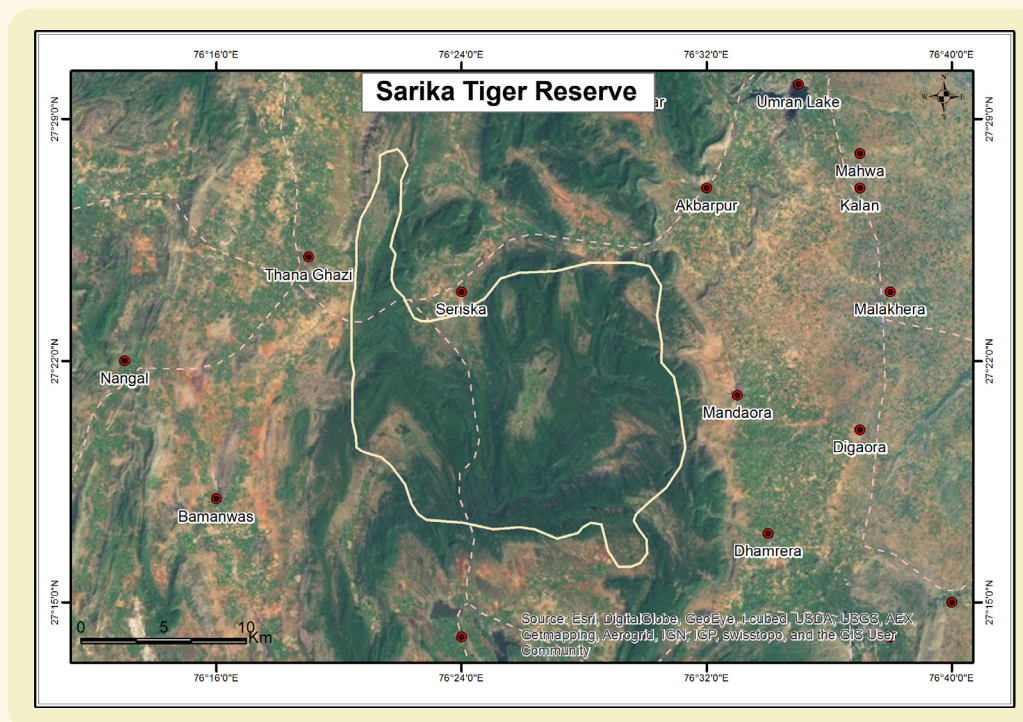
Rainfall : 600 mm

Temperature : 11 °C to 37 °C

Biogeographic Zone : Semi-arid

Habitats : Tropical Dry Deciduous Forest,
Tropical Thorn Forest

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Sariska Tiger Reserve, established in 1978.


GENERAL DESCRIPTION

Sariska Tiger Reserve, situated in the Aravalli Hills, is located in the district of Alwar, in the semi-arid western part of Rajasthan. The tract is mainly hilly and undulating, and has numerous narrow valleys, two large plateaus Kiraska and Kankwari, and two lakes Manasarovar and Somasagar. Siliserh Lake is situated along the northeastern boundary of the reserve. The total protected area is 80,000 ha, of which 30,220 ha is the buffer zone and 49,780 ha the core area. In 2012, a 392 sq. km buffer area was declared around the reserve, which was created in 1978. Numerous archaeological treasures include the ancient Kankwari Fort, situated in the centre of the reserve. Neelkanth and Garh Rajor, dating back to the 9th and 10th centuries respectively, are the ruins of Shaiva and Jain temples. There are three lakes: Manasarovar, Somasagar, and Siliserh, which

attract large numbers of waterbirds, including some Near Threatened ones.

According to Champion & Seth (1968), the vegetation of Sariska is classified as Tropical Dry Deciduous and Tropical Thorn Forest. Dhok *Anogeissus pendula* is the dominant tree species covering 90% of the forest area. *Boswellia serrata* and *Lannea coromandelica* grow on rocky patches. *Acacia catechuoides* and Bamboo *Bambusa arundinacea* are common in the valleys. *Butea monosperma* and *Ziziphus* sp. are also found. Sariska has perhaps the best representative of the original Tropical Dry Deciduous and Thorn Forests of the northern part of the Aravalli Hills.

AVIFAUNA

As far as bird diversity is concerned, Sariska has been studied for the last 25 years. Sankar *et al.* (1993) recorded

more than 210 species: 120 resident, 73 migrant visitors, and 18 vagrants. Shahabuddin *et al.* (2006) reported the occurrence of 183 species. More recently, Sultana (2013) conducted studies from 2007 to 2011, and identified 224 species.

The site lies in Biome 11 (Indo-Malayan Tropical Dry Zone). This biome includes a wide range of habitats including both forests and open country. The Aravalli Hills are largely denuded, except in places like Sariska, where some of the best Tropical Dry Deciduous Forest is found. According to BirdLife International (undated), 59 bird species can be considered as representative of Biome 11, of which 25 have been recorded in Sariska. Most of them are quite common, and also found in man-modified habitat. The most interesting species include Painted Spurfowl *Galloperdix lunulata* that has not been recorded from the arid and semi-arid tracts of Rajasthan (Shankar *et al.* 1993). The Aravalli subspecies of Red Spurfowl *Galloperdix spadicea caurina*, endemic to the Aravallis, is also found in a few localities. Sariska is mainly classified as an IBA on the basis of its Biome 11 bird assemblages. Many globally Threatened species have been reported from Sariska, but none of them have significant populations in this area, except perhaps Sarus Crane *Grus antigone*, which breeds in small numbers in the surrounding fields. Out of the four species of vultures found in Sariska, the breeding population of Critically Endangered White-rumped Vulture *Gyps bengalensis* is not significant anymore. The Long-billed and Egyptian Vultures now breed in significant numbers near Pandupol in the areas now named 'Ghonsala Top'. The remaining Threatened species (Dalmatian Pelican, Greater Spotted Eagle *Clanga clanga*, and Eastern Imperial Eagle *Aquila heliaca*) are migratory and found in small numbers in this IBA. Eleven Near Threatened species have been recorded in fairly significant numbers.

Rare wetland species such as Black Stork *Ciconia nigra*, Bar-headed Goose *Anser indicus*, and Great White Pelican *Pelecanus onocrotalus* have been recorded from waterbodies within Sariska (Shahabuddin *et al.* 2004). Kumar & Shahabuddin (2006) found that forest resource extraction is having significant effects on bird species composition of tropical dry forests through alteration of the vegetation structure.

In a survey Kidwai *et al.* (2011) estimated the abundance and determined the patterns of habitat utilization of seven species of Galliforms in Sariska. The most abundant was the Indian Peafowl *Pavo cristatus*, followed by Grey Francolin *Francolinus pondicerianus*, quail species, and Painted Spurfowl *Galloperdix lunulata*. The density of Black Francolin *Francolinus francolinus*, Rain Quail *Coturnix coromandelica*, and Red Spurfowl *Galloperdix spadicea* could not be determined due to low detection rates.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>

VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Dalmatian Pelican	<i>Pelecanus crispus</i>
Greater Spotted Eagle	<i>Clanga clanga</i>
Eastern Imperial Eagle	<i>Aquila heliaca</i>
Sarus Crane	<i>Grus antigone</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaetus</i>
Laggar Falcon	<i>Falco jugger</i>
Red-headed Falcon	<i>Falco chicquera</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>

BIOME 11 (INDO-MALAYAN TROPICAL DRY ZONE)

Red-naped Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Indian Peafowl	<i>Pavo cristatus</i>
Painted Spurfowl	<i>Galloperdix lunulata</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Sirkeer Malkoha	<i>Phaenicophaeus leschenaultii</i>
Indian Nightjar	<i>Caprimulgus indicus</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Indian Bushlark	<i>Mirafra affinis</i>
Rufous-winged Bushlark	<i>Mirafra assamica</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
White-bellied Minivet	<i>Pericrocotus erythropygius</i>
Indian Robin	<i>Saxicoloides fulicatus</i>
Indian Chat	<i>Cercomela fusca</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Prinia	<i>Prinia sylvatica</i>
Ashy Prinia	<i>Prinia socialis</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>

OTHER KEY FAUNA

Beside the Tiger *Panthera tigris*, for which Sariska was famous, Leopard *P. pardus*, Caracal *Caracal caracal*, Fishing Cat *Prionailurus viverrinus*, Rusty-spotted Cat *Prionailurus rubiginosus* (Sharma *et al.* 2003), Jungle Cat *Felis chaus*, Sambar *Rusa unicolor*, Spotted Deer *Axis axis*, Wild Boar

Sus scrofa, Nilgai *Boselaphus tragocamelus*, Northern Plains Langur *Semnopithecus entellus*, Golden Jackal *Canis aureus*, and Striped Hyaena *Hyaena hyaena* are found. Among reptiles, Indian Python *Python molurus* and Monitor Lizard *Varanus bengalensis* are common.

Rodgers (1990) studied the Algal Spring in Sariska and found that it has greater diversity of fauna and flora than the surrounding woodland. Recently, Gupta *et al.* (2009) reported the presence of the Asiatic Wildcat *Felis silvestris ornata*, also known as the Indian Desert Cat, in Sariska. The cat was photographed using a camera trap.

LAND USE

- Nature conservation and research
- Forestry
- Afforestation

THREATS AND CONSERVATION ISSUES

- Poaching
- Livestock grazing
- Excessive human activity
- Traffic
- Encroachment by surrounding villagers
- Disturbance to birds
- Mining

By 2004, tigers had been exterminated from the reserve. Again, after a two-month survey in 2005, it was declared that Sariska did not have any tigers. Poaching was blamed for the disappearance of the big cat. In 2008, two tigers were re-introduced into the reserve. Another tiger was released in 2009 (Sankar *et al.* 2013). In July, 2014, the estimated population of tigers was 11 individuals, including nine adults. Experts had suggested the relocation of four villages present within the reserve, however, to date only two villages have been moved out.

There are 17 revenue villages located inside or on the outskirts of the buffer zone of Sariska. The main livelihood of the villagers is agriculture and rearing of cattle for milk, so illegal grazing inside the reserve is a constant problem. Two highways pass through Sariska TR that result in many road kills, sometimes including tigers and leopards. There is a demand to shift these roads outside the reserve.

The National Green Tribunal's central zone bench in Bhopal has banned mining activities at 84 stone and marble quarries located inside and within one km radius of the Sariska Tiger Reserve and adjoining Jamuaramgarh Sanctuary.

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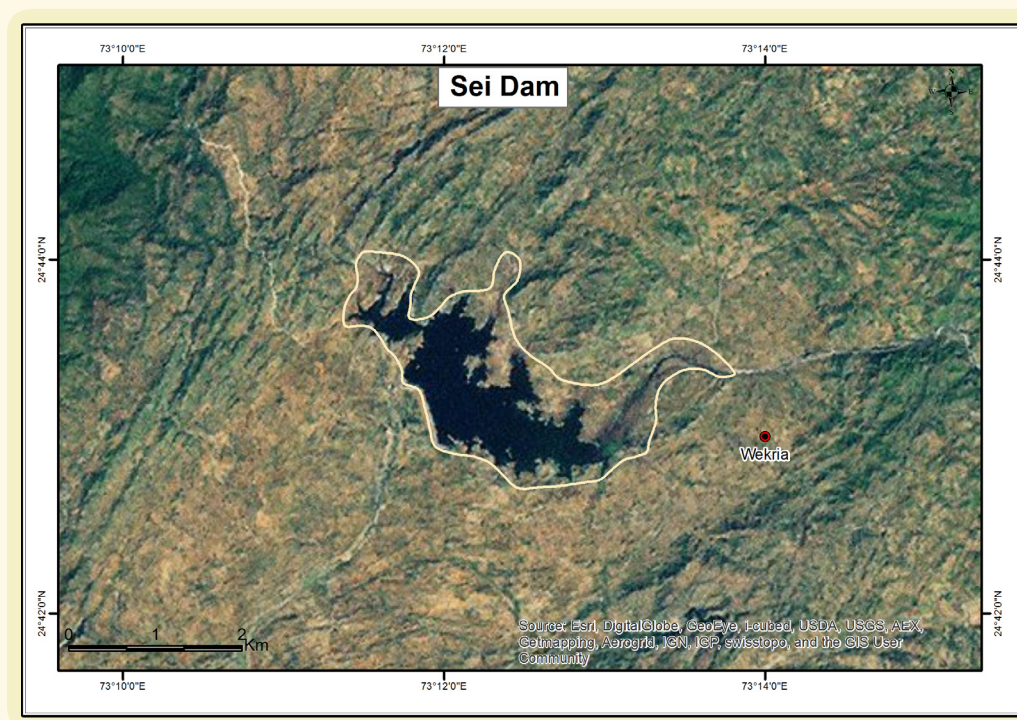
SEI DAM RESERVOIR AND ENVIRONS

IN-RJ-19

IBA Site Code	: IN-RJ-19	Altitude	: 291 msl
State	: Rajasthan	Rainfall	: 650 mm
District	: Udaipur	Temperature	: 5 °C to 42 °C
Coordinates	: 24° 46' 14" N, 73° 11' 60" E	Biogeographic Zone	: Semi-arid
Ownership	: State	Habitats	: Freshwater Reservoir, Tropical Moist Deciduous Forest
Area	: 300 ha		

IBA CRITERIA: A1 (Threatened Species)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

Sei Dam, on the River Sei, has created a large reservoir used mainly for irrigation by the local tribal population. The reservoir serves as an important wintering ground for migratory birds. At the peak period of migration, congregations of more than 10,000 birds can be seen at the site. Moreover, the site lies in the belt of Gogunda-Pindwara Forests, which were once considered an important breeding ground for avifauna (Satish K. Sharma, *pers. comm.*). Due to human activities, this belt is quite disturbed, leaving only a few patches of natural forest.

River Sei originates near Deola village in Udaipur district. The spillover from Sei Dam reaches Jawai Dam (another IBA). From Jawai Dam the spillover reaches Jawai river, which in turn joins the Luni river. Since Jawai and Sei dams are close to each other, local movement of aquatic birds is seen between these two waterbodies.

Sei Dam is c. 90 km by road from Udaipur city on the Udaipur-Pindwara Road. Important flora in the environs of Sei consists of *Anogeissus latifolia*, *Boswellia serrata*, *Phoenix sylvestris*, *Sterculia urens*, *Mangifera indica*, *Syzygium heyneanum*, *Butea monosperma*, *Ficus bengalensis*, *Dendrocalamus strictus*, and *Vitex negundo*. Downstream of the dam, Gotu Kola *Centella asiatica*, a medicinal plant is commonly seen.

AVIFAUNA

The site harbours c. 200 bird species (Satish K. Sharma, *pers. comm.* 2003) and lies in Biome 11. BirdLife International (undated) has listed 59 species in Biome 11. In the forests surrounding Sei Dam, 32 of these 59 species are known to occur. We have included this site as an IBA mainly because a stretch of thorn forest from Sei Dam to Anadara is important for the globally Threatened White-naped Tit

Parus nuchalis and Green Munia *Amandava formosa*. The thorn forest, though now degraded, could be quite important for these two species. Detailed studies are needed to know the status of these two Vulnerable species. In the shallow zones of the reservoir, Sarus Crane *Grus antigone* is found. Flocks of Sarus Crane, when disturbed at Sei dam, move towards the Jawai dam area.

Occasionally, globally threatened species of vultures are seen, particularly White-rumped Vulture *Gyps bengalensis* and Egyptian Vulture *Neophron percnopterus*. There are earlier records of Red-headed Vulture *Aegypius calvus*.

Kulshreshtha (2002) recorded 17 waterbird species in Sei Dam, including 25 Bar-headed Geese *Anser indicus* and Black-headed Ibis *Threskiornis melanocephalus*, but none of them were in significant numbers. Therefore, this site is identified as an IBA mainly for the presence of White-naped Tit *Parus nuchalis* and Green Munia *Amandava formosa*, rather than for its waterfowl population. However, during subnormal rainfall years, when smaller waterbodies are dry, large congregations of waterfowl can be seen here.

OTHER KEY FAUNA

The forested area surrounding the site harbours Leopard *Panthera pardus*, Striped Hyaena *Hyaena hyaena*, Golden Jackal *Canis aureus*, Sloth Bear *Melursus ursinus*, Four-horned Antelope *Tetracerus quadricornis*, Indian Pangolin *Manis crassicaudata*, Indian Crested Porcupine *Hystrix indica*, Ruddy Mongoose *Herpestes smithi*, and Northern Plains Grey Langur *Semnopithecus entellus*.

LAND USE

- Irrigation
- Fisheries
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Destruction of forests in the catchment area, leading to siltation of the water reservoir
- Excessive fishing by tribals
- Encroachment on marginal areas
- Disturbance to birds by human activities on the marginal areas

The area surrounding the Sei Dam is managed by the Forest Department. The tribal population around the site depends largely on fuel wood collection. Their cattle graze on the forest vegetation. To check these adverse factors in the forest areas adjoining the dam, alternatives such as development of non-conventional energy resources (biogas plant installation) to meet the tribals' fuel needs and development of pasture land to alleviate the problem of grazing, should be encouraged by the administration.

KEY CONTRIBUTORS

Satish K. Sharma, Manoj Kulshreshtha.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
White-naped Tit	<i>Parus nuchalis</i>
Green Munia	<i>Amandava formosa</i>

NEAR THREATENED

Black-headed Ibis	<i>Threskiornis melanocephalus</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
European Roller	<i>Coracias garrulus</i>

BIOME-11: INDO-MALAYAN TROPICAL DRY ZONE

Red-naped Ibis	<i>Pseudibis papillosa</i>
Long-billed Vulture	<i>Gyps indicus</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Red-necked Falcon	<i>Falco chicquera</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Rock Bush-quail	<i>Perdica argoondah</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrceros birostris</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Indian Lark	<i>Mirafra erythroptera</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
White-throated Babbler	<i>Dumetia hyperythra</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Indian Chat	<i>Cercomela fusca</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail	<i>Rhipidura aureola</i>
White-naped Tit	<i>Parus nuchalis</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>

KEY REFERENCE

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SITAMATA WILDLIFE SANCTUARY

IN-RJ-20

IBA Site Code : IN-RJ-20

State : Rajasthan

District : Chittorgarh, Udaipur, Pratapgarh

Coordinates : 23° 55' 15" N,
74° 25' 29" E

Ownership : State

Area : 42,294 ha

Altitude : 524 msl

Rainfall : 640 mm

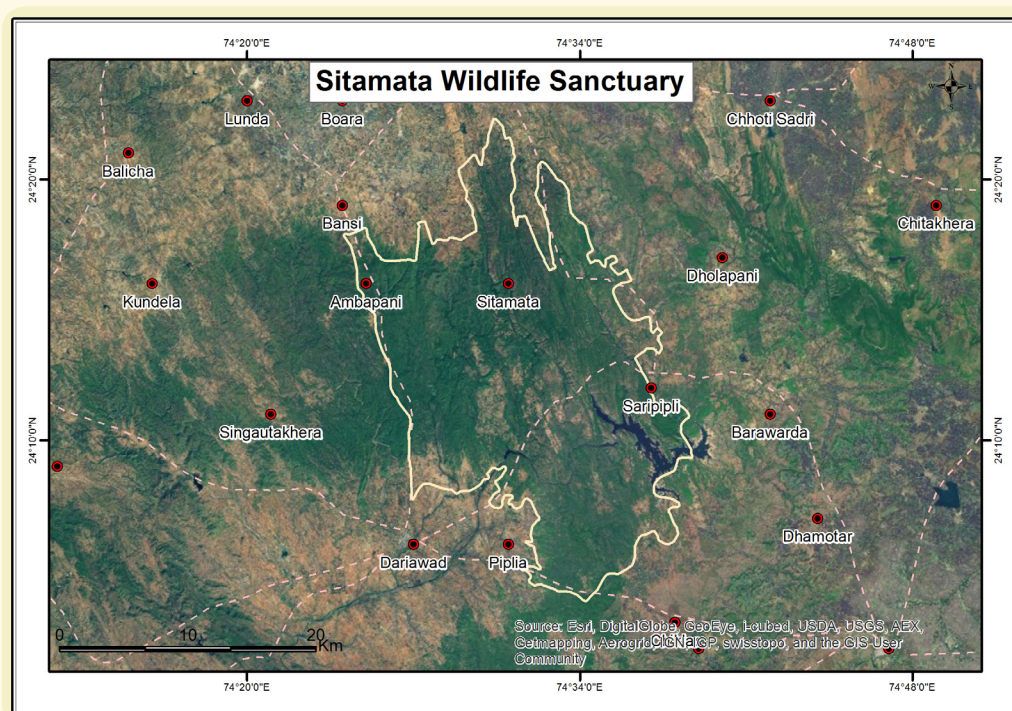
Temperature : 7 °C to 46 °C

Biogeographic Zone : Semi-arid

Habitats : Tropical Dry Deciduous Forest

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone).

PROTECTION STATUS: Wildlife Sanctuary, established in January 1979.



GENERAL DESCRIPTION

Sitamata Wildlife Sanctuary is located in south Rajasthan at a distance of 130 km from Udaipur city, in three districts namely Chittorgarh, Pratapgarh, and Udaipur. The sanctuary represents the only Teak forest in Rajasthan state, and is known for the presence of an isolated population of Elliot's Giant or Indian Giant Flying Squirrel *Petaurista philippensis* (Tehsin 1980, Sharma 2007, Koli *et al.* 2013 a, b).

Before India's independence, the area served as a major supplier of bamboo. On the southeast of the sanctuary lies Jakham Dam across the Jakham river. High hilly tracts surround it. In this hilly part of the sanctuary, large colonies of Long-billed Vulture *Gyps indicus* were present up to the 1990s. The hill colonized by vultures was known as Giddha Magra, i.e., hill of vultures, but now few remain (Raza Tehsin, *pers. comm.* 2002).

The forest of the sanctuary has mythological importance,

as it is the forest where Goddess Sita is believed to have spent her last days after being banished from Ayodhya by Lord Rama. The sanctuary gets its name from her. Inside the sanctuary, River Jakham divides into two rivulets named Luv and Kush, that rejoin after passing through the sanctuary. It is said that the river makes thirteen bends inside the sanctuary. The flow of these rivulets throughout the year makes the forest lush green in the plain areas, with a crown density of over 40%.

Sitamata is at the junction of the Aravalli and Vindhyan ranges, which makes the biodiversity of the sanctuary very significant. The important woody vegetation of the site includes Teak *Tectona grandis*, *Butea monosperma*, *Diospyros melanoxylon*, *Buchanania lanzan*, *Embllica officinalis*, *Wrightia tomentosa*, *Grewia flavescens*, *Tamarindus indica*, *Mangifera indica*, *Ficus glomerata*, *Syzygium cumini*, and *Syzygium heyneanum*, with large

patches of Bamboo *Dendrocalamus strictus*. A Medical Plant Conservation Area (MPCA) has been developed by the Forest Department to protect *Buchanania lanzan* and its associates in this sanctuary.

AVIFAUNA

The area is quite rich in avifauna, and 178 bird species are reported from the site (Bhardwaj 2008, Sharma 2002). The site lies in Biome 11 (Indo-Malayan Tropical Dry Zone), where BirdLife International (undated) has listed 59 bird species in the biome-restricted assemblages. In the forests and grasslands of Sitamata, 29 species of this biome have been recognized, hence the site qualifies for A3 criteria. It also has a small nesting colony of Long-billed Vulture *Gyps indicus*, now much depleted. Ten species recognized as Near Threatened are also found here.

OTHER KEY FAUNA

The sanctuary is known for the presence of an isolated population of Indian Giant Flying Squirrel *Petaurista philippensis philippensis*. Except in the Western Ghats where it is found on both sides of the Palghat Gap in Karnataka, Tamil Nadu, and Kerala, this subspecies is found in small isolated extant forest pockets in Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Chhattisgarh, Andhra Pradesh, and Odisha (Menon 2014). Sitamata is an important area for this taxon.

Other vertebrates commonly seen are Northern Plains Langur *Semnopithecus entellus*, Wild Boar *Sus scrofa*, Blue Bull *Boselaphus tragocamelus*, Sambar *Rusa unicolor*, Spotted Deer *Axis axis*, Chinkara *Gazella bennettii*, Four-horned Antelope *Tetracerus quadricornis*, and Black-naped Hare *Lepus nigricollis*. The important predators are Leopard *Panthera pardus*, Grey Wolf *Canis lupus*, Striped Hyaena *Hyaena hyaena*, Golden Jackal *Canis aureus*, and Indian Fox *Vulpes bengalensis*. Indian Pangolin *Manis crassicaudata* and Indian Crested Porcupine *Hystrix indica* also occur.

The Common Tree Frog *Polypedates maculatus* is visible during the monsoon. It can even be seen inside the buildings of surrounding villages (Sharma 1997). Painted Frog *Kalourla taprobranca* is another amphibian which can be seen during the monsoon in ditches under Mahua trees in certain pockets.

LANDUSE

- Forestry, plantations
- Human settlements
- Agriculture
- Water management
- Nature conservation and research
- Tourism and recreation

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Laggar Falcon	<i>Falco jugger</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
European Roller	<i>Coracias garrulus</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-headed Vulture	<i>Aegypius calvus</i>
Long-billed Vulture	<i>Gyps indicus</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Red-headed Falcon	<i>Falco chicquera</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Rock Bush-quail	<i>Perdica argoondah</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrceros birostris</i>
Brown-headed Barbet	<i>Megalaima zeylanica</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Red-winged Lark	<i>Mirafra erythroptera</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Indian Chat	<i>Cercomela fusca</i>
Jungle Prinia	<i>Prinia sylvatica</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail-flycatcher	<i>Rhipidura aureola</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>

THREATS AND CONSERVATION ISSUES

- Village inside the sanctuary
- Illegal felling of trees
- Firewood collection
- Poaching
- Vehicular traffic
- Invasive weeds
- Disturbance to birds due to human activities
- Fire hazards
- Presence of power lines in flying squirrel habitat



DHRTIMAN MUKHERJEE

Chinkara *Gazella bennettii* is found in the grasslands, desert and also Tropical Thorn Forest and Dry Deciduous Forest that is found in Sitamata Wildlife Sanctuary. Besides having nearly 180 bird species, Sitamata is also famous for having an isolated population of Indian Giant Flying Squirrel *Petaurista philippensis*

The site bears the only natural Teak forest in Rajasthan. Since teak serves as an important source of timber of economic value, the site faces acute threat from illegal felling. Besides this, a large human population inhabits the sanctuary area, due to which human activities such as agricultural practices, firewood collection, and poaching are severe threats.

Rodgers & Panwar (1988) have recommended that at least 20,000 ha of extant teak forest should be declared as a national park. This will help to safeguard this poorly protected habitat.

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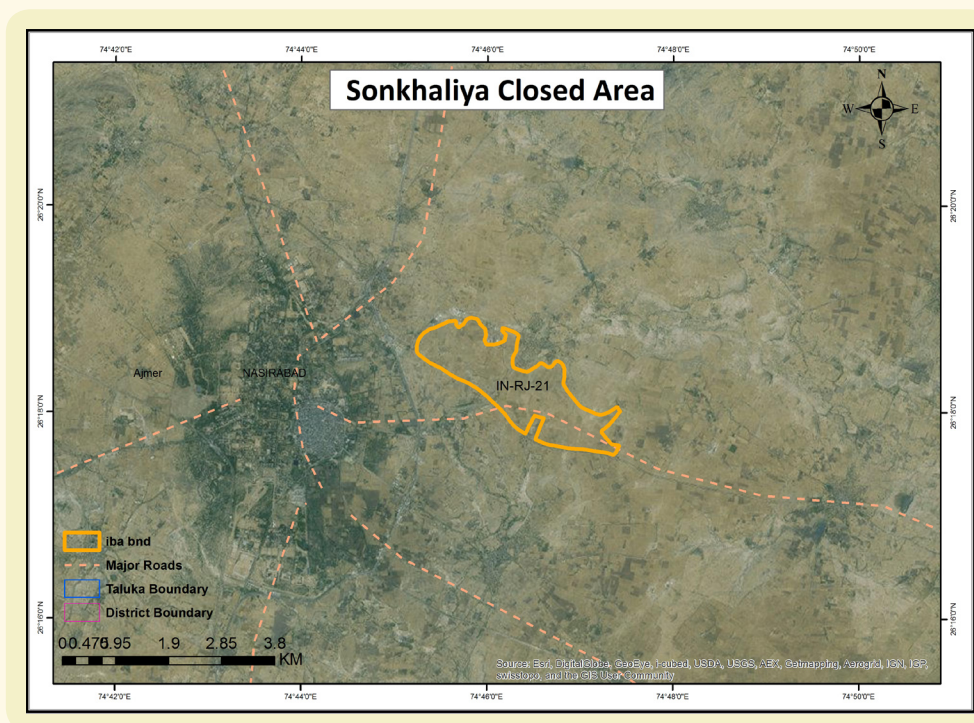
SONKHALIYA CLOSED AREA

IN-RJ-21

IBA Site Code	: IN-RJ-21	Area	: 17,134 ha
State	: Rajasthan	Altitude	: 470 msl
District	: Ajmer	Rainfall	: 500 mm
Coordinates	: 26° 18' 00" N, 74° 46' 00" E	Temperature	: 2 °C to 45 °C
Ownership	: Private and community land	Biogeographic Zone	: Semi-arid
		Habitats	: Tropical Secondary Scrub

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

Sonkhaliya is one of the few sites which provides shelter to the Great Indian Bustard *Ardeotis nigricaps* (Rahmani & Manakadan 1983, Rahmani 1987). During some surveys done in the latter half of the 1980s, the population of this bird was estimated to be c. 1,500–2,000 for the whole country, with Rajasthan holding more than half (Rahmani 1986, 1987). Sonkhaliya held a population of more than 80 bustards (Rahmani & Manakadan 1988). It is one of the preferred bustard areas, as it is more or less plain with crop fields and highly degraded scrub forest. The main natural flora of the site consists of species of *Prosopis*, *Acacia*, and *Capparis*. Cultivated crops are also present. Earlier it was notified as Closed Area in 1980 with an area of 526.81 sq. km. In the amended Indian Wildlife Protection Act, 2006, the Closed Area concept was changed to Community or Conservation Reserve. Though efforts were again made by

the Forest Department to bring the area under Community Reserve, the local *panchayat* (village council) did not agree. A Community Reserve can be established on private land with the concurrence of land owners.

Although Lesser Florican *Sypheotides indicus* is found, along with many raptors and other species, the trigger species was the Great Indian Bustard. With the present precarious number of Great Indian Bustards (GIB) surviving in Sonkhaliya, it can be considered as an IBA in Danger. It is only a matter of time when this Critically Endangered bird will become extinct in Sonkhaliya.

AVIFAUNA

No published checklist of birds is available, but it is assumed that more than 100 species, including many globally Threatened species are present in this IBA site.

There has been a drastic decline in the number of the

Critically Endangered Great Indian Bustard. In the 1980s, it was not uncommon to see flocks of 10–15 bustards in a day. The largest flock was of 55 bustards photographed by Kailash Sankhala in the early 1980s (R.S. Rathore, *pers. comm.* 2001). During a survey in 1986, 30 bustards were sighted by Rahmani (1986) in January. However, in January 2002, only five were seen after spending almost the whole day in search of this bird. The sightings increased to 15 birds in 2010, which included two chicks, showing that GIB were still breeding (Joshua *et al.* 2011). A GIB chick was seen adjoining Jowar *Sorghum vulgare* crop in 2010. Only two GIB were seen in Sonkhaliya in 2012 during a Lesser Florican Survey in the landscape (Gobind Sagar Bhardwaj *pers. comm.* 2014).

The Lesser Florican *Sypheotides indicus* is still found here during the monsoon in small numbers. It is difficult to estimate total numbers, as the population and distribution fluctuates from year to year, depending upon the rainfall pattern. According to Gobind Sagar Bhardwaj (*pers. comm.* 2013), in 2013, nearly 120 male floricans were seen by the local staff in and around Sonkhaliya. A landscape of around 400 sq. km located south-east of Nasirabad town in Ajmer district, bearing a mosaic of agricultural land and degraded village pastures, is now known for Lesser Florican. Most of the sightings are in the villages Sonkhaliya, Sanod, Ramsar,

CRITICALLY ENDANGERED	
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Great Indian Bustard	<i>Ardeotis nigriceps</i>
ENDANGERED	
Lesser Florican	<i>Sypheotides indicus</i>
Egyptian Vulture	<i>Neophron percnopterus</i>
VULNERABLE	
Sarus Crane	<i>Grus antigone</i>
Stoliczka's Bushchat	<i>Saxicola macrorhyncha</i>
NEAR THREATENED	
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Cinereous Vulture	<i>Aegypius monachus</i>

Chat, Loharwada, Kesharpura, Bahera, Bhagwantpura, Jhadwasa, Batiyani, Rampura, Sonkhali, Kebaniya, Hanotiya, Piproli, Kalyanpura, Sewndariya, Dantol, and Shergarh.

Another globally Threatened species occurring in this site is Stoliczka's Bushchat, also called White-browed Bushchat *Saxicola macrorhyncha*. It is found in select dry patches, but is not difficult to sight. During winter, sighting of the Endangered Egyptian Vulture *Neophron percnopterus* in and



GOBIND SAGAR BHARDWAJ

Although the Great Indian Bustard *Ardeotis nigriceps* has almost disappeared from Sonkhaliya Closed Area the Lesser Florican *Sypheotides indicus* is fortunately still seen in large numbers during good monsoon



Lesser Florican *Sypheotides indicus* has adapted to live in Soyabean fields which are of low height, suitable for this species

around this site is very common, sometimes in large numbers (Justus Joshua and Himani Kala, *pers. comm.* 2011).

Among the Near Threatened species, Painted Stork *Mycteria leucocephala* and Black-headed Ibis *Threskiornis melanocephalus* are found in pools during good monsoon years, but not in any significant numbers. However, the Cinereous Vulture *Aegypius monachus* is regularly seen during winter. There are chances that Macqueen's Bustard *Chlamydotis macqueeni* could occur here during winter, because the habitat looks suitable in places, and this species has been found further east, in Sorsan Bustard Area in Baran district.

Vultures that used to be extremely common 20–25 years ago are now very uncommon, with occasional sighting of Egyptian Vulture *Neophron percnopterus* and Red-headed Vulture *Aegypius calvus*. The White-rumped Gyps *bengalensis* and Long-billed *G. indicus* vultures are almost locally extinct.

The site lies in Biome 11 (Indo-Malayan Tropical Dry Zone), in which BirdLife International (undated) has listed 59 species as biome-restricted assemblages. In this site, 24 such species have been identified till now, and more Biome 11 species are likely to occur.

OTHER KEY FAUNA

The other fauna which are usually associated with bustard habitats and are present in this site include Golden Jackal *Canis aureus*, Indian Fox *Vulpes vulpes*, and Jungle

Cat *Felis chaus*. Blue Bull *Boselaphus tragocamelus* have increased intolerably in recent years, resulting in man-animal conflicts.

LAND USE

- Agriculture
- Village pasture lands

THREATS AND CONSERVATION ISSUES

- Overgrazing
- Spread of cultivation/intensive cultivation
- Poaching
- Invasive species (*Prosopis chilensis*)
- Mining
- Pesticide use
- Invasion by shrub and tree species into the grassland

Almost all the land belongs to farmers, with monsoonal cultivation and grazing are the main occupation. Therefore, the area is under tremendous pressure due to extension of crop fields and intensive grazing.

Since most of the land is under private ownership (in the form of cultivated land), habitat management for the benefit of the bustard is difficult. Therefore, not much can be done except for appointment of staff and establishment of a few core areas. The locals should be made aware of the significance of this bustard species, the importance of grassland and its



In the monsoon of 2013 thanks to the rainfall nearly 120 male floricans were seen in and around Sonkhaliya

protection, that would not only help the bustards but also improve the fodder availability in the area.

Owing to increase in the population of Blue Bull or Nilgai, many villagers have stopped growing Bengal Gram *Cicer arietinum*, which is the main winter food of the Great Indian Bustard in Sonkhaliya (R.S. Rathore, *pers. comm.* 2001; also see Rahmani 1989, Bhushan & Rahmani 1992). In the surrounding areas dominated by Muslims, where Blue Bull menace is not so much due to regular hunting, Bengal Gram is still grown in a large area. This attracts bustards to the crop fields, where they are not safe due to the presence of hunters. Poaching is the single most important reason for the drastic decline in the number of bustards in Sonkhaliya and the rest of Rajasthan. However, except for posting one forest guard, the Rajasthan Forest Department has not taken any long-term measures to protect the bustards of Sonkhaliya.

There is an urgent need to study the movement of the Great Indian Bustard through telemetry and colour banding, to find out their main breeding centres for more effective protection, and also to identify some core areas where livestock grazing can be curtailed during the breeding season of the bustard. However, the most important step would be to prevent poaching by posting more guards and by an extensive environmental education programme.

The population of Blue Bull should be checked, so that farmers can go back to their traditional crop pattern. Unless these measures are taken, the chances of survival of the Great Indian Bustard in Sonkhaliya are very remote.

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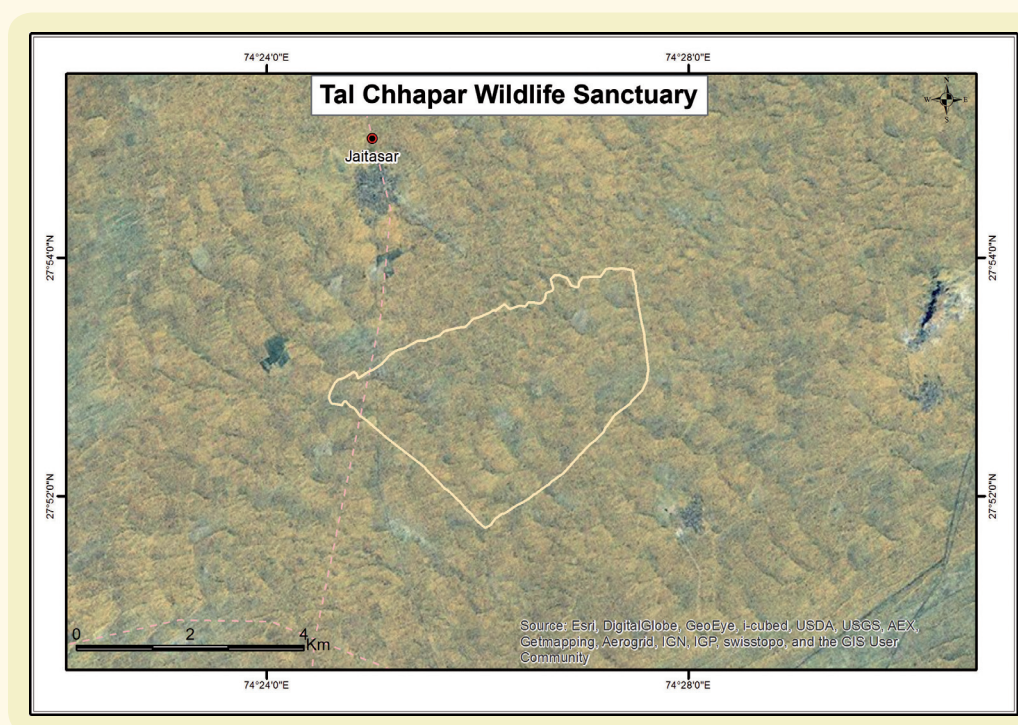
TAL CHHAPAR WILDLIFE SANCTUARY

IN-RJ-22

IBA Site Code	: IN-RJ-22	Area	: 1,400 ha
State	: Rajasthan	Altitude	: 305 msl
District	: Churu	Rainfall	: 200 mm
Coordinates	: 27° 52' 00" N, 74° 30' 49" E	Temperature	: 2 °C to 48 °C
Ownership	: State	Biogeographic Zone	: Desert
		Habitats	: Tropical Arid Zone

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Wildlife Sanctuary, established in 1971.



GENERAL DESCRIPTION

Although Tal Chhapar Wildlife Sanctuary in Churu district is famous for Blackbuck *Antelope cervicapra*, it is also popular with bird lovers. As the name ‘Tal’ suggests, it is an open, flat land with a depression, which used to get inundated during good rainfall years. However, after the blockage of water channels in the Gopalpura hills, and illegal establishment of salt works, the water regime has changed and Tal Chhapar does not get as much water as it used to.

The Tal Chhapar was a hunting reserve of the Maharaja of Bikaner and it was famous for Blackbuck and Demoiselle Crane *Grus virgo* shoots. The Maharaja of Bikaner had 200 wooden life-size dummies of Demoiselle Crane in various postures to lure the wild cranes and induce them to approach the waiting guns (Rahmani 1997). The last crane shoot took place in 1962.

The dominant species of trees in Tal Chhapar are *Prosopis cineraria*, *Ziziphus nummularia*, *Capparis decidua*, and a variety of grasses and sedges, the most important sedge being *Cyperus rotundus*. The brackish soil of the sanctuary also supports salt-loving small bushes and grasses.

AVIFAUNA

Tal Chhapar is situated in north-western Rajasthan, and lies on the migratory path of many birds. The most spectacular migration seen here is that of harriers. Verma (2010) extensively studied the harriers in Tal Chhapar WLS. He found four species of harriers, namely Eurasian Marsh Harrier *Circus aeruginosus*, Montagu’s Harrier *C. pygargus*, Pallid Harrier *C. macrourus*, and Hen Harrier *C. cyaneus* roosting at Tal Chhapar during the winter of 2008. Of the total 118 sightings, the Eurasian Marsh Harrier accounted

for 46%, Montagu's 38%, Pallid 13%, and Hen Harrier 3%. Similarly, four species of harriers were observed roosting in the sanctuary during the winter of 2009, however there was a drop in the number of Eurasian Marsh Harriers and an increase in Pallid Harriers. Of the total 180 sightings, Eurasian Marsh Harrier accounted for 28%, Montagu's 37%, Pallid 32%, and Hen Harrier 4%.

During 2008 (118 harrier sightings), there were 53% juveniles, 31% females, and 15% males. During 2009, (180 sightings), there were 41% juveniles, 37% females, and 22% males. In 2008, in terms of number of individuals sighted, the total was 54 Eurasian Marsh Harrier, 45 Montagu's, 15 Pallid, and four Hen Harrier (Verma 2010).

Tal Chhapar is a regular wintering ground of the Critically Endangered Sociable Lapwing *Vanellus gregarius*. Sangha (2000) reported sighting five lapwings on October 14, 1995 (Sangha 2000), 15 on January 28, 1998, and 11 on February 01, 1998. Surat Singh Poonia sighted four lapwings on October 24, 2010 and Gaurav Bhatnagar sighted four on November 14, 2010 (Kasambe 2011).

The Vulnerable Eastern Imperial-eagle *Aquila heliaca* is also found in the IBA. Short-toed Snake Eagle *Circaetus gallicus* appears to be quite common. With the improvement in grassland habitat, many important raptors are being seen regularly, like Laggar Falcon *Falco jugger*, Common Kestrel

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

VULNERABLE

Eastern Imperial Eagle	<i>Aquila heliaca</i>
White-browed (Stoliczka's) Bushchat	<i>Saxicola macrorhynchus</i>

NEAR THREATENED

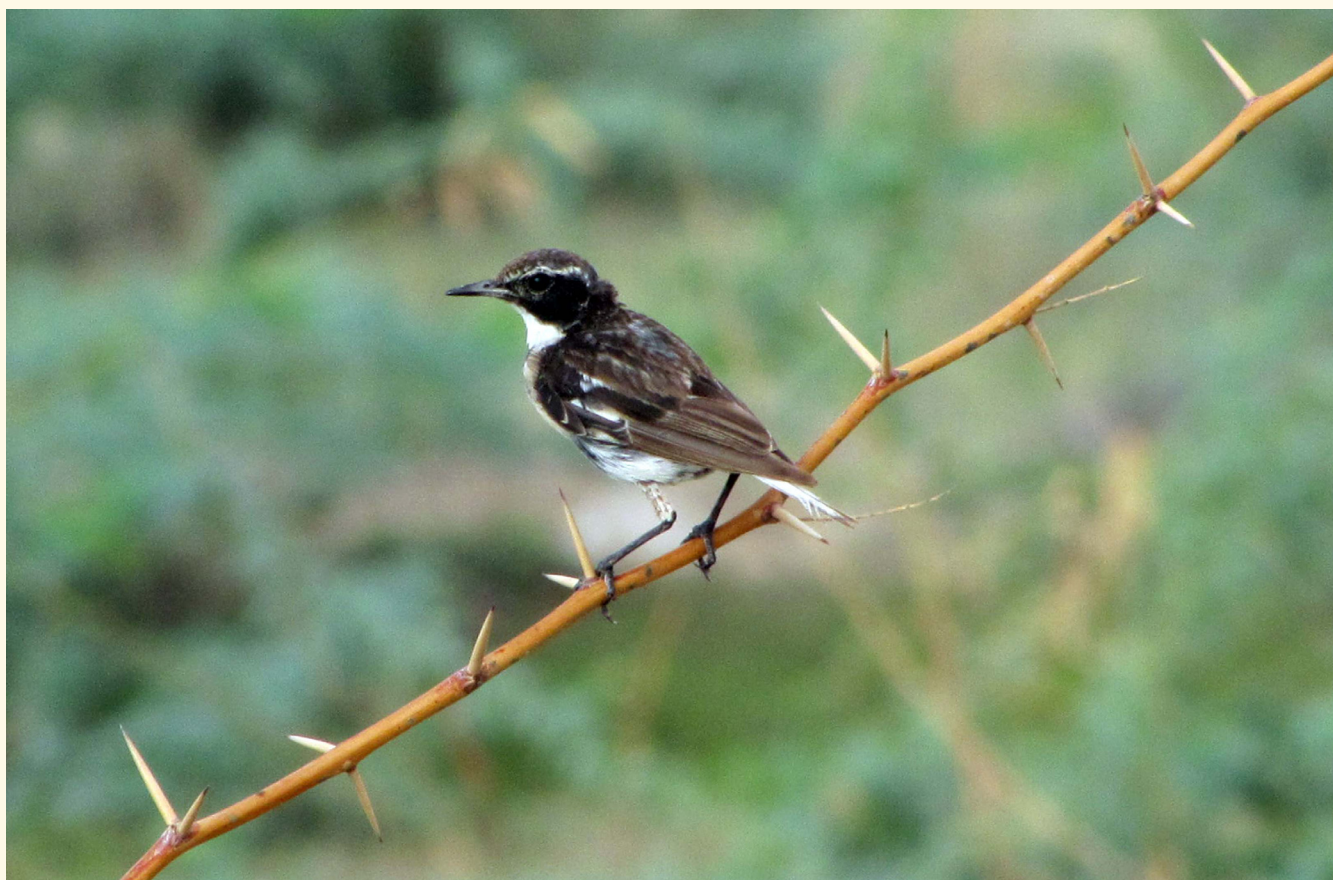
Cinereous Vulture	<i>Aegypius monachus</i>
Pallid Harrier	<i>Circus macrourus</i>
Laggar Falcon	<i>Falco jugger</i>
Eurasian Curlew	<i>Numenius arquata</i>
River Tern	<i>Sterna aurantia</i>
European Roller	<i>Coracias garrulus</i>

Falco tinnunculus, Lesser Kestrel *Falco naumanni*, Steppe Eagle *Aquila nipalensis*, and Tawny Eagle *Aquila rapax*.

The European or Kashmir Roller *Coracias garrulus* passes through the area on migration during September and October, whereas the Oriental Skylark *Alauda gulgula*, Crested Lark *Galerida cristata*, Indian Ring Dove or Eurasian Collared Dove *Streptopelia decaocto*, Little Brown Dove or Laughing Dove *S. senegalensis*, and Indian Roller *Coracias bengalensis* can be found throughout the year. Blue-tailed Bee-eater *Merops philippinus* and Green Bee-eater *M. orientalis* are commonly found, for this is their



Tal Chhapar is one of the very few grasslands dominated sanctuary of India. During the last one decade thanks to very good management, population of all grassland species such as Blackbuck *Antelope cervicapra* (above) have increased



SURAT SINGH POONIA

Besides iconic Blackbuck *Antelope cervicapra* Tal Chhapar has become birdwatcher's paradise thanks to the presence of rarities such as White-browed Bushchat *Saxicola macrorhynchus*

breeding ground. The Red-naped or Black Ibis *Pseudibis papillosa* is frequently seen. However, the most famous migratory phenomenon is the arrival of Demoiselle Cranes *Grus virgo* in the first week of September and their stay till March. According to the records of the Forest Department, up to 2,000 cranes are seen. This would be twice the 1% population threshold determined by Wetlands International (2012). The cranes are attracted to the tubers of *Cyperus* (Rahmani 1987). White-browed or White-browed or Stoliczka's Bushchat *Saxicola macrorhynchus* is now being recorded regularly and a very healthy population exists here. Another important species is the Bar-headed Goose *Anser indicus*. It is not unusual to see more than 100 birds grazing in the grasslands of Tal Chhapar. Earlier records show that they used to come in much larger numbers when this waterbody remained inundated for a much longer period.

Till the early 1990s, the White-rumped Vulture *Gyps bengalensis* used to breed in and around Tal Chhapar. During a survey in 1993–1994, many nests were located on Khejri *Prosopis cinerea* trees, sometimes as low as 4 m (Rahmani 1987). The Long-billed Vulture *Gyps indicus* was also seen during winter. Among the globally Threatened species, the Critically Endangered Red-headed or King Vulture *Aegypius calvus* and Near Threatened Cinereous Vulture *Aegypius monachus* are found in this site. Egyptian

Vulture *Neophron percnopterus* is regularly seen in the sanctuary. Lately, there are fewer sightings of White-rumped and Long-billed Vultures.

Tal Chhapar was selected as an IBA mainly due to its important situation on the migratory path of a large number of birds, and also as an important feeding area for Demoiselle Crane and Bar-headed Goose.

OTHER KEY FAUNA

The most famous large mammal of Tal Chhapar is the Blackbuck *Antelope cervicapra*. Nearly 2,500 of these are present. The other major mammals are Golden Jackal *Canis aureus*, Indian Fox *Vulpes bengalensis*, Red Fox *Vulpes vulpes pusilla*, Jungle Cat *Felis chaus*, and Desert Hare *Lepus nigricollis dayanus* (Rahmani 1987). Chinkara *Gazella bennettii* is present in the surrounding sand dunes, but is rarely seen in Tal Chhapar WLS. Among the reptiles, Spiny-tailed Lizard *Saara hardwickii* is abundant. The Indian Monitor Lizard *Varanus bengalensis* is also found, but in comparatively small numbers.

LAND USE

- Nature conservation and research
- Tourism and recreation
- Illegal salt mining

THREATS AND CONSERVATION ISSUES

- Livestock grazing in some parts (900 ha is totally free from grazing)
- Invasive species (not at present)
- Illegal salt mining

The Forest Department introduced *Prosopis juliflora* (= *chinensis*) more than a decade ago, which ran wild over the main grassland. Half-hearted measures were taken by the Forest Department, pleading lack of resources, but probably lack of will was the greatest hindrance. This pernicious weed had overrun almost half of the grasslands, but it has now been removed from most of the area, and further invasion is immediately tackled.

Killing of Blackbuck by village dogs *Canis familiaris* is another menace which, coupled with overgrazing by livestock, is creating havoc. The village dogs meticulously search out Blackbuck fawns who cannot find enough places to hide, as the grass is all grazed by livestock (Rahmani 1984, 1997). Despite Tal Chhappar being a sanctuary for almost 45 years and posting of forest staff, the Forest Department has not been able to control the menace of overgrazing.

To top it all, the illegal establishment of salt mines after a surreptitious transfer of sanctuary land to the Revenue Department has permanently damaged this site. Under immense political pressure, the Forest Department transferred 417 acres of land to the Revenue Department, which immediately gave this land over to salt works (Sharma & Singh 1989). Constant flow of labour and trucks disturbs the wildlife. Further details of threats, and measures required to protect Tal Chhappar, are given by Rahmani (1987).

Presently, Tal Chhappar is one of the best managed sanctuaries in Rajasthan. A grassland area of 900 ha is fenced and completely free of grazing or other disturbances. Another area of c. 400 ha across the road, called 'Goshala' locally, may also be fenced shortly as the proposal to close the road for traffic is in its final stages. Presently, in this part, cattle grazing is allowed but other indigenous trees have proliferated after removal of *Prosopis juliflora*, which has resulted in sightings of Spotted Tree Creeper *Salpornis spilonotus*, buzzards, and eagles. Spiny-tailed Lizard *Uromastyx hardwickii* is abundant in this part. The salt-pans and rain water ditches support a number of waterbirds.

According to Verma (2010), the following measures should be taken for the conservation of roosting harriers in Tal Chhappar:

1. A detailed and long-term monitoring programme should be initiated for harriers (at least for five years initially) at Tal Chhappar which is an important stopover for these long distance Palearctic migrants. Areas up to 50 km west and

north of the sanctuary should be surveyed during July to October to collect information on population and distribution of harriers, and to determine whether roosting habitats for harriers exist there.

2. Satellite telemetry studies should be initiated on harriers at Tal Chhappar WLS, especially on Pallid Harrier which is a Near Threatened species. This will help to collect more information on their distribution in India. Information on whether harriers from here converge to the Velavadar roost (in Gujarat), the largest roost in India with more than 2000 individuals (Clarke *et al.* 1998), or spread to some other parts of the country. Many small and large communal roosts can be located easily by conducting such studies.

3. A study on the impact of overpopulation of Blackbuck, especially on roosting harriers in Tal Chhappar WLS, should also be taken up. Harriers have been observed shifting their roosting site quite a number of times at night, as they get disturbed by Blackbuck movement.

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UDAIPUR LAKES COMPLEX (PICHOLA, INTERCONNECTING WATER BODIES AND FATEHSAGAR)

IN-RJ-23

IBA Site Code : IN-RJ-23

State : Rajasthan

District : Udaipur

Coordinates : 24° 34' 60" N, 73° 49' 00" E

Ownership : State

Area : 3,030 ha

Altitude : 526 msl

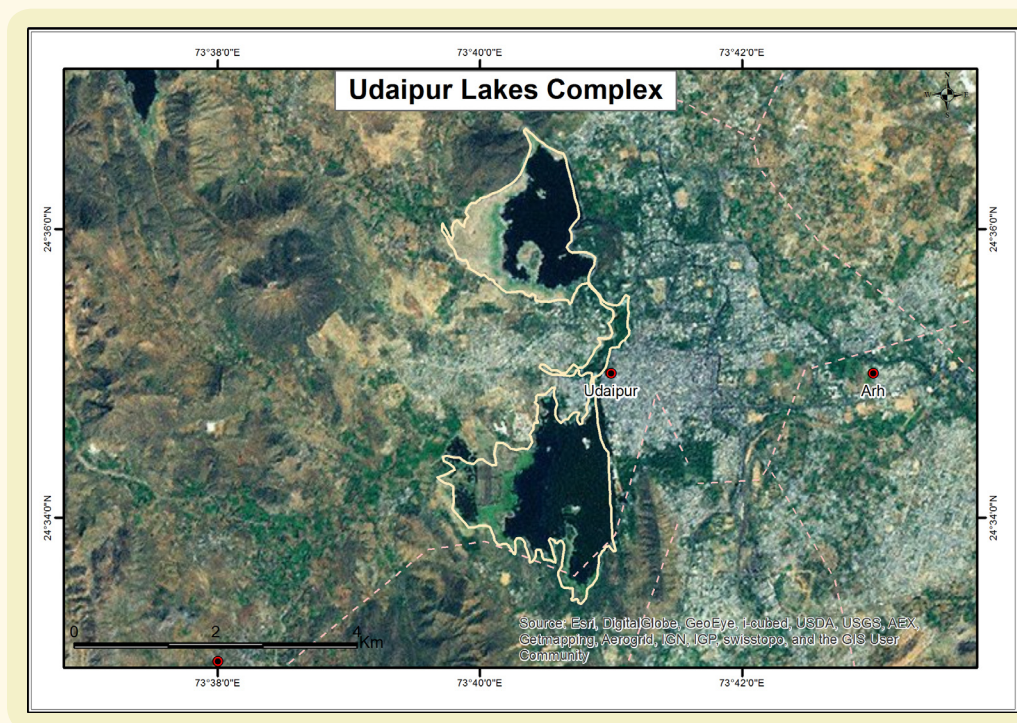
Rainfall : 560 mm

Temperature : 4 °C to 38 °C

Biogeographic Zone : Semi-arid

Habitats : Freshwater Reservoir

IBA CRITERIA: A1 (Threatened species), A4i (1% of biogeographic population)

PROTECTION STATUS: Not officially protected


GENERAL DESCRIPTION

The lake complex of Udaipur City consists of two important lakes, namely Pichola (960 ha) and Fatehsagar (2,070 ha), interconnected by two more, Rangasagar and Swaroopsagar. This complex of lakes is situated in the western part of Udaipur City. The former rulers of Mewar had built these lakes.

Fatehsagar has four islands within it. One has been converted into a garden, Nehru Park; on another smaller island, a Solar Observatory has been erected; the third, a rocky outcrop, has been converted into a fountain; a fourth island is near the northwestern shore. Pichola has two important islands on which the Lake Palace Hotel and Jag Mandir Palace are located.

The main source of water for Pichola Lake is Sisarma river. From Pichola, water is diverted to interconnecting waterbodies, which in turn supply it to Fatehsagar.

Fatehsagar also receives water from a small canal, *Madarka-Nallah*, connected to River Berach.

Before India's Independence, the water from Fatehsagar was hardly used and the lake remained more or less full throughout the year. Presently, all these lakes serve as an important source of water for domestic purposes in Udaipur city.

Despite the fact that these lakes are within the growing Udaipur City, they attract a large number of waterfowl, up to 10,000 individuals. Recently, two artificial islands have been created in Fatehsagar Lake under the National Lake Conservation Project to support the birdlife of this waterbody.

The macrophytic community is composed of 14 species at Pichola Lake and 16 species at Fatehsagar Lake (Sankhla *et al.* 1996). *Eichhornia* dominates Pichola, while *Nelumbo* and *Nymphoides* alternately dominate Fatehsagar in the



DHIRTIMAN MUKHERJEE

Udaipur lake complex consists of interconnected waterbodies such as Pichola, Fatehsagar, Rangasagar and Swaroopsagar

floating zone community. *Hydrilla* dominates the submerged zone community in both the lakes, throughout the year. The emergent zone community is dominated by *Paspalidium geminatum* and *Elaeocharis palustris*. Deweeding is now a regular process to control the excessive growth of aquatic weeds.

AVIFAUNA

More than 85 bird species (Tehsin 1989, Sharma 2002) have been reported from this site and its environs. These include species of Biome 11 (Indo-Malayan Tropical Dry Zone).

Large congregations of Spot-billed Duck *Anas poecilorhyncha*, Northern Shoveller *Anas clypeata*,

Black-winged Stilt *Himantopus himantopus*, and Great Cormorant *Phalacrocorax carbo* can be seen during the peak of winter.

Spot-billed Pelican *Pelecanus philippensis* is regularly sighted from this Lake complex, more than 150 were counted in the winter of 2002 (R. Tehsin, *pers. comm.* 2003). Sarus Crane *Grus antigone* (one or two pairs) is frequently observed during winter in the fields surrounding Lake Pichola, whereas Pied Tit *Parus nuchalis* is most commonly sighted from the forest area in the catchment of Lake Fatehsagar (Jamunia Ki Nal) (R. Tehsin, *pers. comm.* 2003). This tit species is common in the surrounding forest areas of Kaler, Machhla Magra, Neemuch Mata, Moti Magri, Sajjangarh Wildlife Sanctuary, and Banki.

VULNERABLE

Sarus Crane	<i>Grus antigone</i>
White-naped Tit (Pied Tit)	<i>Parus nuchalis</i>
Green Munia	<i>Amandava formosa</i>

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Pallid Harrier	<i>Circus macrourus</i>
Great Thick-knee	<i>Esacus recurvirostris</i>

OTHER KEY FAUNA

The environs of the lakes do not harbour any major mammalian and reptilian fauna of conservation concern. However, the surrounding forests support populations of Panther *Panthera pardus*, Striped Hyaena *Hyaena hyaena*, Golden Jackal *Canis aureus*, Jungle Cat *Felis chaus*, Rusty-spotted Cat *Prionailurus rubiginosus*, Small Indian Civet *Viverricula indica*, Common Palm Civet *Paradoxurus hermaphroditus*, and Indian or Blacknaped Hare *Lepus nigricollis*. The lake complex serves the drinking water needs of many wild animals of the surrounding forest. A



The Complex of Udaipur lakes attracts thousands of waterfowl and it is presumed that more than 20,000 waterbirds use these lakes during winter. Dry scrub forest in the catchment of lake Fatehsagar has many pairs of White-naped Tit, a Vulnerable species

DHIRTIMAN MUKHERJEE

big population of fruit bats, especially Indian Flying Fox *Pteropus giganteus* is found. The lakes are inhabited by many reptilian species like Indian Sawback *Kachuga tecta*, Indian Mud Turtle *Lissemys punctata*, Ganges Softshell Turtle *Aspideretes gangeticus*, and the snake Checkered Keelback *Xenochrophis piscator*.

LAND USE

- Tourism and recreation
- Nature conservation and research
- Fishing
- Agriculture
- Water management

THREATS AND CONSERVATION ISSUES

- Pollution
- Encroachment on catchment areas by human settlements
- Unregulated tourism with increasing use of motorboats
- Disturbance to the birds by water sports
- Siltation

Due to constant disturbance by boats and road traffic, as well as decrease in the aquatic flora, the lakes are becoming inhospitable for migratory birds. Some of the damage done to these wetlands is irreversible, such as construction around the lakes and blockage of surface water run-off from the

catchment areas. Other damage, such as habitat destruction on the islands and excessive recreational boating, could be rectified by the collective effort of the local population and administration. The Natural Environment Education and Development (NEED) Organization regularly conducts bird census in these lakes, along with mass awareness programmes with the help of the Forest Department and Department of Science & Technology, Government of Rajasthan.

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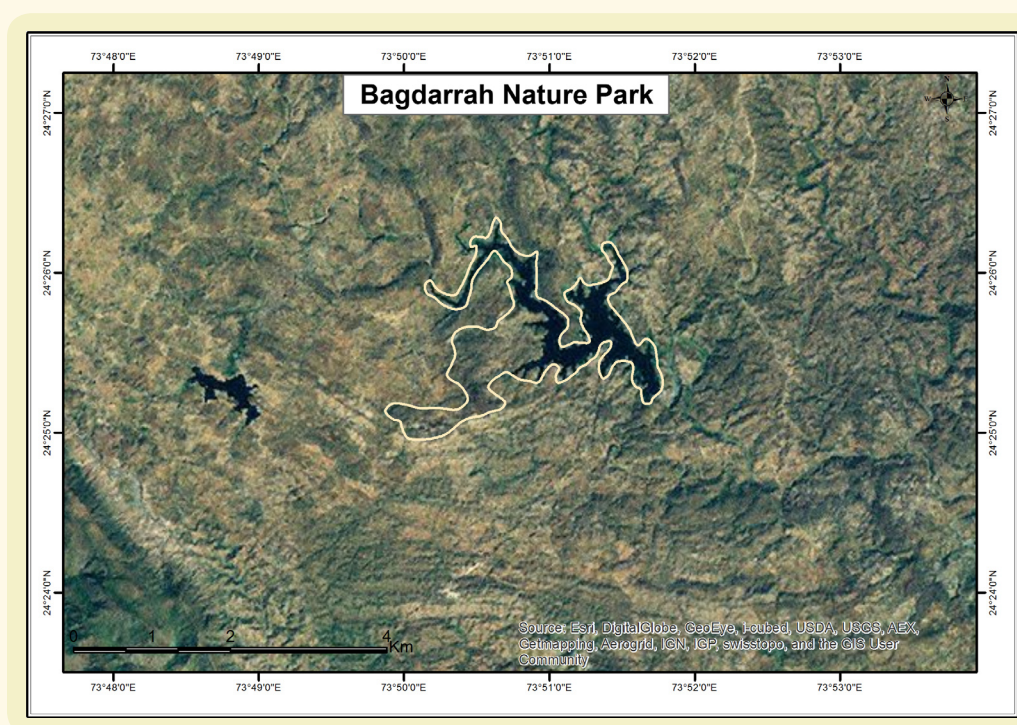
BAGHDARRAH NATURE PARK

IN-RJ-24

IBA Site Code	: IN-RJ-24	Altitude	: 508 msl
State	: Rajasthan	Rainfall	: 650 mm
District	: Udaipur	Temperature	: 4 °C to 42 °C
Coordinates	: 24° 28' 00" N, 73° 52' 00" E	Biogeographic Zone	: Semi-arid
Ownership	: State	Habitats	: Freshwater Swamp, Tropical Dry Deciduous Forest
Area	: 342.19 ha		

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Protected by Forest Department.



GENERAL DESCRIPTION

The Baghdarrah Nature Park is situated 15 km east of Udaipur on the Udaipur-Jhamar Kotra Road, in the Aravalli Hills. As the name indicates, the area used to have Tiger *Panthera tigris*. Records reveal that the forest included in the Protected Area used to be the *shikargah* (hunting grounds) of the erstwhile rulers of Mewar.

Baghdarrah Lake, which spreads over 30 ha, provides ideal habitats for aquatic flora and fauna. A number of migratory waterfowl can be seen on the lake during winter. The site provides an excellent home for Marsh Crocodile *Crocodylus palustris*, which were seen freely floating on the water.

The vegetation of the surrounding area represents Dry Deciduous and Thorn Forest types. Tall trees in the forest patch provide nesting sites for vultures. The important

tree species of the forest include *Sterculia urens*, *Butea monosperma*, *Terminalia* spp., *Ficus* spp., *Acacia* spp., *Cassia fistula*, and *Boswellia serrata*. Major aquatic flora include *Polygonum glabrum*, *Typha angustata*, *Nelumbo nucifera*, and *Trapa natans*.

AVIFAUNA

About 130 bird species are reported from this IBA site (Sharma 2002). The site qualifies as Biome 11 (Indo-Malayan Tropical Dry Zone). Sarus Crane *Grus antigone* has been observed frequently, possibly coming from other lakes of Udaipur (Satish K. Sharma, *pers. comm.* 2003).

OTHER KEY FAUNA

Other important fauna includes Leopard *Panthera pardus*, Jungle Cat *Felis chaus*, Golden Jackal *Canis aureus*,

Bengal Fox *Vulpes bengalensis*, Indian Crested Porcupine *Hystrix indica*, Black-naped Hare *Lepus nigricollis*, Common Mongoose *Herpestes edwardsi*, Marsh Crocodile *Crocodylus palustris*, Brahminy Skink *Mabuya carinata*, Indian Monitor Lizard *Varanus bengalensis*, John's Earth Boa *Eryx johnii*, Rat Snake *Ptyas mucosus*, Cobra *Naja naja* and Russell's Viper *Daboia russelii*. As many as 34 species of reptiles are available in the forest of Baghdarrah Nature Park (Bhatnagar & Mahur, 2008; Mahur, 2010).

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
White-naped Tit	<i>Parus nuchalis</i>
Green Munia	<i>Amandava formosa</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-naped Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Sirkeer Malkoha	<i>Phaenicophaeus leschenaultii</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyeros birostris</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Bank Myna	<i>Acridotheres ginginianus</i>

LAND USE

- Human settlements
- Agricultural practices
- Forestry
- Nature conservation and research
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Livestock grazing
- Poaching
- Pollution due to phosphate factories
- Invasive weeds

Besides their main role of supplying water to the city, the lakes of Udaipur are important for a large number of waterfowl. However, due to scanty rainfall in recent years, especially 1998 onwards, these lakes are facing water shortage. At the same time, disturbance to birdlife is increasing due to human activities (recreational boating, pumping of water, pollution by sewage and garbage). As a result, many birds leave these city lakes and turn to Baghdarrah, where increasingly large numbers of waterbirds (around 8,000) can be seen now. Besides waterbirds, terrestrial and arboreal birds can be seen here. Downstream of the dam, there is a semi-evergreen riverine strip along the banks, which supports a huge number of Rock Bee *Apis dorsata* hives.

Baghdarrah is located away from city environs, and the water is not used for domestic purposes, so the lake provides a fine habitat for winter birds. Recognizing this, the Wildlife Division of the Forest Department had taken steps in 2002 to safeguard the site for birds and for crocodiles.

However, all these efforts face difficulties due to the pollution load from the phosphate factories in the environs. Acidic emission from these factories enters the atmosphere and affects air quality. Besides, the water released from the factories is polluting groundwater resources. If measures are not taken to solve this problem, the future of this IBA site will be in jeopardy.

Just 4 km away from Baghdarrah lies Udai Sagar, the largest lake of Udaipur. Udai Sagar supports 10,000 to 15,000 aquatic birds during the winter season. Local movement of birds can be seen between Baghdarrah and Udai Sagar lakes.

KEY CONTRIBUTORS

Satish K. Sharma, Raza H. Tehsin, Satya P. Mehra, Sarita Sharma.

KEY REFERENCES

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- Mahur, M. (2010) Study of Reptilian diversity of Baghdarrah Nature Park with special reference to the behaviour of *Crocodylus palustris* Lesson. Ph.D. Thesis. MLSU, Udaipur, Rajasthan.
- Sharma, S.K. (2002) Preliminary Biodiversity Survey of Protected Areas of Southern Rajasthan. Unpublished Report. Pp. 1–23.

BADOPAL LAKE

IBA Site Code : IN-RJ-25

Administrative Region : Rajasthan

(State)

District : Hanumangarh

Coordinates : 29° 22' 13.88" N;
74° 5' 11.10" E

Ownership : State

Area : c. 25 sq. km

Altitude : 1064 m

Rainfall : 100–500 mm

Temperature : 1° C to 49° C

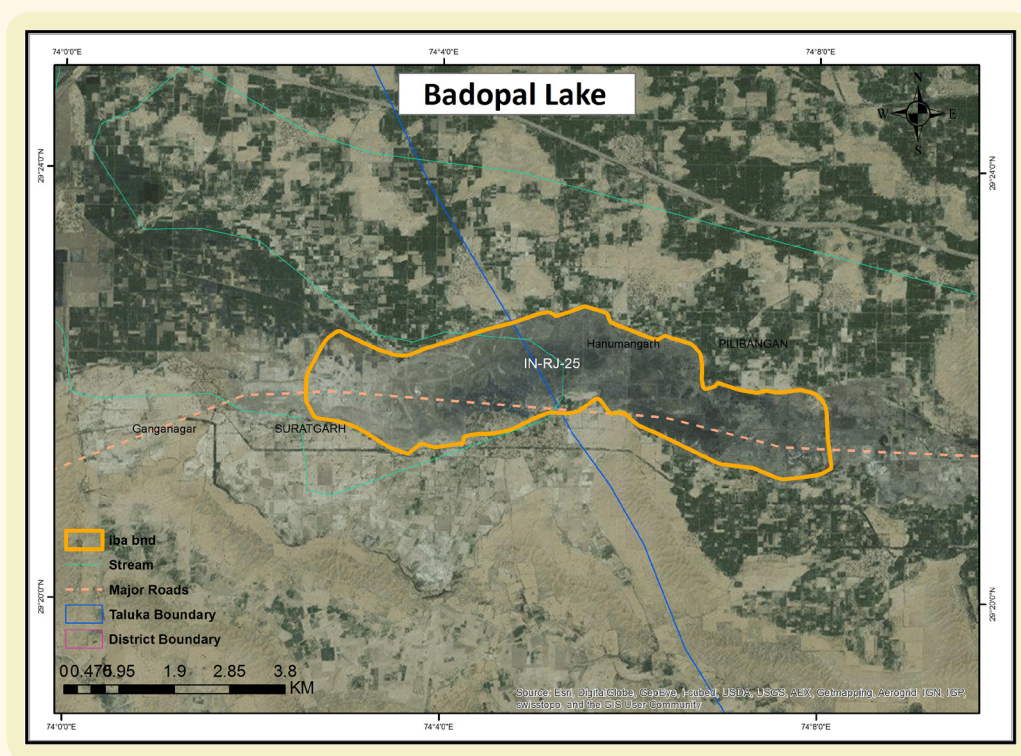
Biogeographic Zone : Arid

Habitats : Wetland (Freshwater,
turning saline)

IN-RJ-25

IBA CRITERIA : A1 (Threatened species), A4iii (<20,000 birds)

PROTECTION STATUS : Not officially protected.



GENERAL DESCRIPTION

Badopal Lake is situated on the Suratgarh-Bikaner Road, located c. 20 km north of Suratgarh and c. 19 km south of Pilibanga. The lake is visible from the national highway NH 15. The lake is about 25 sq. km in size, 9 km wide and 2 km at its widest span. Badopal is a freshwater lake, but due to salinity in the soil, the lake turns saline after the rains in winter. Several migratory species of birds including Lesser Flamingo *Phoeniconaias minor* and Greater Flamingo *Phoenicopterus roseus* are seen here.

AVIFAUNA

A total of 81 species of birds, including the Lesser and

Greater Flamingoes, Pied Avocet *Recurvirostra avosetta*, Common Crane *Grus grus*, Red-naped or Black Ibis *Pseudibis papillosa*, Black-headed Ibis *Threskiornis melanocephalus*, pelicans *Pelecanus* spp., and River Tern *Sterna aurantia*, are commonly seen. Oriental Darter *Anhinga melanogaster*, Black-tailed Godwit *Limosa limosa*, and Ferruginous Duck *Aythya nyroca* can also be seen here.

Due to salinity in the lake, Greater Flamingo and Pied Avocet can be seen. Most of the stork species, like White Stork *Ciconia ciconia*, Asian Woollyneck *Ciconia episcopus*, Painted Stork *Mycteria leucocephala*, and Asian Openbill *Anastomus oscitans* are seen in Badopal Lake.



VIRENDRA SINGH

More than 20,000 waterbirds are found in Badopal.
Very large number of waders use Badopal as a stopover site before moving further south

OTHER KEY FAUNA

Other wild animals, including large mammals Chinkara *Gazella bennetti*, Blackbuck *Antelope cervicapra*, Nilgai *Boselaphus tragocamelus*, Bengal Fox *Vulpes bengalensis*,

and Jungle Cat *Felis chaus* are present in the environs of the lake.

LAND USE

- Agriculture

THREAT AND CONSERVATION ISSUES

- Use of insecticide in crop fields
- Encroachment in the lake
- Sand silting due to sand dunes

KEY CONTRIBUTORS

Sumit Dookia and Himmat Singh.

KEY REFERENCE

Vijayan, L. and Vijayan, V.S. (2013) Conservation and Management of Wetland Birds in Rajasthan: Perspectives and Challenges. In *Faunal Heritage of Rajasthan, India* (eds Sharma, B.K., Kulshreshtha, S. and Rahmani, A.R.) Springer International Publishing. Pp. 231–244

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Sarcogyps calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>

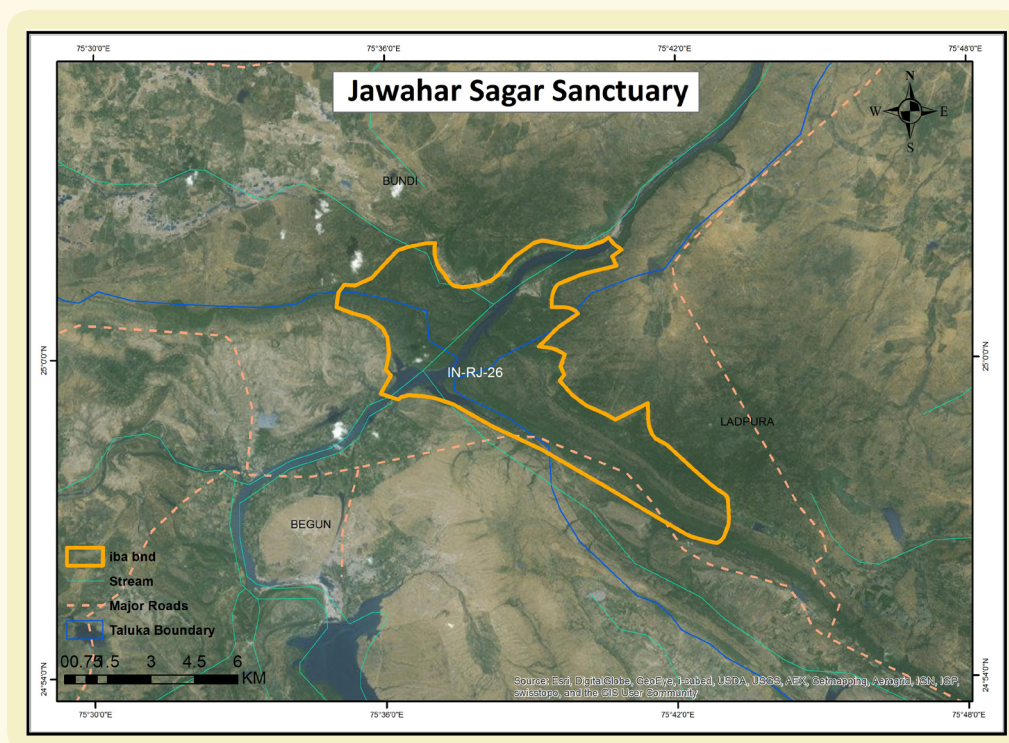
JAWAHAR SAGAR SANCTUARY

IBA Site Code	: IN-RJ-26	Area	: 153.41 sq. km
Administrative Region (State)	: Rajasthan	Altitude	: 265 msl
District	: Kota, Chittorgarh and Bundi	Rainfall	: 600 mm
Coordinates	: 25° 1'38.74"N & 75°38'33.30"E please correct it	Temperature	: 3° C to 48° C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Dry Deciduous Forest, Riverine vegetation

IN-RJ-26

IBA CRITERIA: A1 (Threatened species), A4i (1% of global population)

PROTECTION STATUS: Wildlife Sanctuary, declared in 1975.



GENERAL DESCRIPTION

Jawahar Sagar Sanctuary covers an area of 153 sq. km, providing a contiguous forest cover for the tigers of Darrah Sanctuary, extending into Bhainsrorgarh Sanctuary in Rajasthan, and Gandhi Sagar Sanctuary in Madhya Pradesh. Jawahar Sagar Sanctuary has varied habitats, with a part of Chambal river, the confluence of Chambal and Brahmani rivers, backwaters of the Jawahar Sagar Dam, and terrestrial areas with undulating grass covered hillocks and forested areas, all of which provide a haven for varied flora and fauna. The most important tree species is Salar *Boswellia serrata*, followed by Dhok *Anogeissus pendula*. Amaltas *Cassia fistula*, Arjun *Terminalia arjuna*, Neem *Azadirachta indica*, Banyan *Ficus benghalensis*, and Peepal *F. religiosa* are found in suitable habitats.

AVIFAUNA

About 150 species of birds have been recorded from the sanctuary (Himmat Singh, *pers. comm.* 2014). White-rumped Vulture *Gyps bengalensis*, Long-billed or Indian Vulture *Gyps indicus*, Red-headed Vulture *Aegypius calvus*, and Egyptian Vulture *Neophron percnopterus* are regularly seen in the area. Painted Spurfowl *Galloperdix lunulata*, several francolins, quails, Asian Paradise Flycatcher *Terpsiphone paradisi*, Golden Oriole *Oriolus oriolus*, White-browed Fantail *Rhipidura aureola*, Pallid Harrier *Circus macrourus*, River Tern *Sterna aurantia*, Black-headed Ibis *Threskiornis melanocephalus*, Plum-headed Parakeet *Psittacula cyanocephala*, and Alexandrine Parakeet *Psittacula eupatria* are some of the important bird species of the sanctuary.

The ledges in the river valley host more than 150 nesting



On the craggy mountainsides, some nests of Long-billed Vulture *Gyps indicus* are still found

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed (Indian) Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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NEAR THREATENED

Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Pallid Harrier	<i>Circus macrourus</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>

pairs of Long-billed Vultures and their chicks. About 20 pairs of White-rumped Vultures breed on Arjun and Ficus trees in the sanctuary. Egyptian Vultures breed on trees as well as on the ledges. Alexandrine Parakeets also breed in large numbers in the area.

OTHER KEY FAUNA

Chinkara *Gazella bennettii*, Sloth Bear *Melursus ursinus*, Smooth-coated Indian Otter *Lutrogale perspicillata*, Golden Jackal *Canis aureus*, Striped Hyaena *Hyaena hyaena*, and

Indian Crested Porcupine *Hystrix indica*, are regularly encountered in the sanctuary. Marsh Crocodile *Crocodylus palustris* have made Brahmani river their home. Red-crowned Roofed Terrapin *Kachuga kachuga*, and Ganges Softshell *Aspideretes gangeticus* are also seen in the riverine tracts.

LAND USE

- Nature conservation and research
- Recreation and tourism
- Agriculture
- Pasture

THREAT AND CONSERVATION ISSUES

- Illegal logging
- Livestock grazing
- Excessive human presence
- Encroachment on land

KEY CONTRIBUTORS

Rakesh Vyas, Himmat Singh.

KEY REFERENCE

Anon. (2010) Management Plan of Jawahar Sagar Sanctuary. Department of Forests & Wildlife, Kota, Rajasthan.

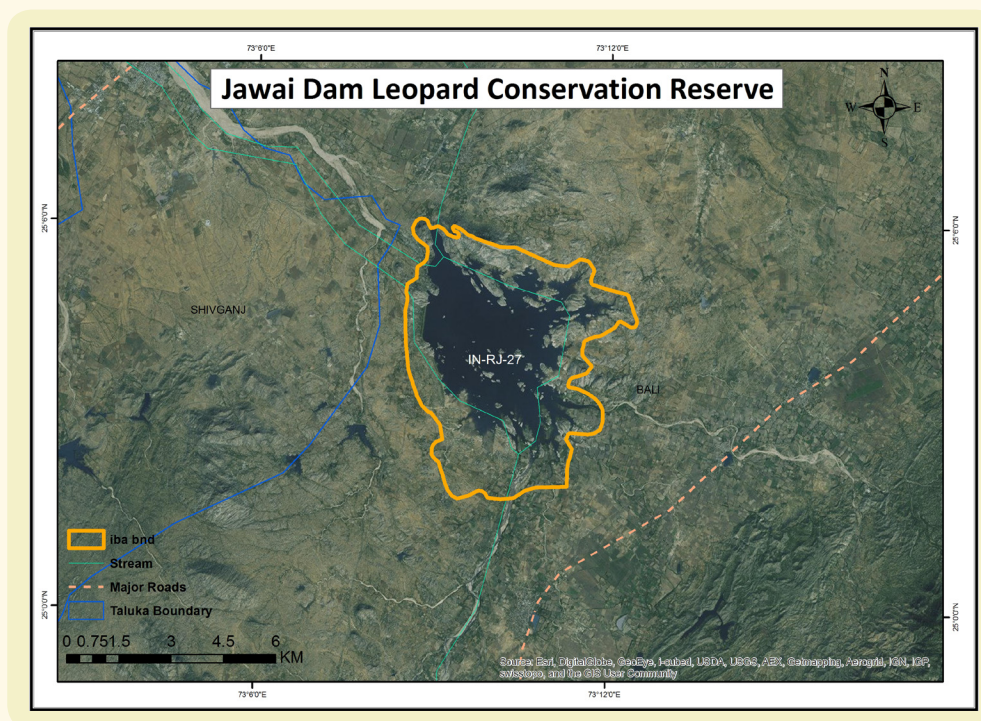
JAWAI DAM LEOPARD CONSERVATION RESERVE

IN-RJ-27

IBA Site Code	: IN-RJ-27	Area	: 19.78 ha
State	: Rajasthan	Altitude	: 259 msl
District	: Pali	Rainfall	: 425 mm
Coordinates	: 73° 02' to 73° 08' E, 25° 07' to 25° 12' N	Temperature	: 6 °C to 45 °C
Ownership	: Forest & Water Resources Department	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Reservoir

IBA CRITERIA: A1 (Threatened species), A4iii (>20,000 waterbirds)

PROTECTION STATUS: Protected by Forest Department. Declared as a Conservation Reserve on February 27, 2013.



GENERAL DESCRIPTION

Situated in the fragile Aravallis ecosystem, Jawai Conservation Reserve is 50 km southwest of Sadri town. Jawai Dam constitutes an integral part of the Jawai Reserve. The site is situated in Pali district, at the transition zone of the Aravallis (southern Aravallis) and the Luni basin (desert ecosystem). Jawai Dam, which is a major source of potable water for western Rajasthan, is constructed on Jawai river, one of the west-flowing rivers of Rajasthan. Ultimately, this river joins the Luni, which empties into the Rann of Kutch. In the beginning, Jawai Dam provided drinking water to Jodhpur and Pali city. It still provides drinking water to Pali city, but Jodhpur now gets its water from the Indira Gandhi Canal. The dam is the property of the Irrigation Department, however, the forest and wildlife of the area are managed by the Forest Department, Sumerpur Range of Pali Forest Division.

Jawai Dam is connected by road and by rail through the Delhi-Ahmedabad broad gauge railway line. It can be approached via the Pali-Sirohi highway by turning from Sumerpur. Bera area has become a major tourist destination for its Leopard “show” and its beautiful topography.

According to Raza Tehsin, an expert naturalist of the Udaipur region, “the topography of Bera consists of rocky formations with stone boulders having crevices and shallow caves; an ideal breeding ground for leopards. Before Independence when there was no fragmentation of jungles, it was connected with the Kumbhalgarh forest. It was teeming with wild ungulates so there was no scarcity of prey. It provided a good habitat for leopards owing to the numerous caves in the crevices which were safe for their offspring. This part of land was under Jodhpur estate before Independence and was a favourite hunting ground for the

Jodhpur royal family. The terrain was quite difficult to arrange a beat. Therefore most of the hunting was done by tying up live bait and sitting on a *machaan*.”

Jawai Dam was declared as Conservation Reserve vide Government of Rajasthan Notification No. F3 (4)/ For. 2012 dated 27.02.2013 under the provision of Section 36A of the Wildlife (Protection) Act, 1972. This 19.78 sq. km reserve was created mainly to protect a very healthy population of Leopard *Panthera pardus*, hence it is also called Jawai Dam Leopard Conservation Reserve.

Natural vegetation consists of sparse growth of Babool *Acacia nilotica*, Kumath *Acacia senegal*, Ronjh *Acacia leucophloea*, Khejri *Prosopis spicigera*, Dhok *Anogeissus pendula*, and Gangeran *Grewia tenex*. Vilayati Babool *Prosopis juliflora* is also penetrating the area. Patches of *Typha angustata*, *Phragmites karka*, *Scirpus* sp., and *Ipomoea aquatica* are seen at the water's edge along the dam and environs. Other species identified are *Hydrilla verticillata*, *Ceratophyllum demersum*, *Vallisneria spiralis*, *Potamogeton crispum*, *Azolla pinnata*, *Spirodela polyrhiza*, and *Wolffia arrhiza*.

AVIFAUNA

About 85 species of terrestrial aquatic birds have been reported in Jawai Dam Leopard Conservation Area. Among them Cotton Pygmy-goose *Nettapus coromandelianus*,

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
Asian Woollyneck	<i>Ciconia episcopus</i>

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Great Thick-knee	<i>Esacus recurvirostris</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Laggar Falcon	<i>Falco jugger</i>
River Tern	<i>Sterna aurantia</i>
European Roller	<i>Coracias garrulus</i>

Knob-billed or Comb Duck *Sarkidiornis melanotos*, Indian Spot-billed Duck *Anas poecilorhyncha*, and Lesser Whistling Duck *Dendrocygna javanicus* are the major resident species.

During the winter months of December and January, 10,000 to 15,000 waterfowl are found in the dam. The



DHIRTIMAN MUKHERJEE

Jawai Dam is a part of Bera Leopard Conservation Reserve. Nearly 20,000 birds use the dam in a year. Thousands of waders and ducks are sometimes seen on migration. Bera has become very popular among tourist who come mainly to see leopard

Dam also serves as stopover sites because sometimes very large numbers of ducks are seen for some days which disappear after that. In total, more than 20,000 waterbirds use Jawai Dam in a year. Common Crane *Grus grus*, Rosy Pelican *Pelecanus onocrotalus*, Greater Flamingo *Phoenicopterus roseus*, Lesser Flamingo *Phoeniconaias minor*, Black-headed Ibis *Threskiornis melanocephalus*, Glossy Ibis *Plegadis falcinellus*, Bar-headed Goose *Anser indicus*, Greylag Goose *Anser anser*, Gadwall *Anas strepera*, Northern Shoveller *Anas clypeata*, Northern Pintail *Anas acuta*, Common Pochard *Aythya ferina*, Common Teal *Anas crecca*, Spotted Redshank *Tringa erythropus*, Wood Sandpiper *Tringa glareola*, Oriental Darter *Anhinga melanogaster*, and Shaheen Falcon *Falco peregrinus peregrinator* are some of the signature species of Jawai Dam. Sarus Crane *Grus antigone* can be seen here almost round the year. During summer, large congregations of this species can sometimes be seen in the backwater of the dam.

Many terrestrial birds like wheatears, sandgrouses, lapwings, larks, and pipits can be seen in the area surrounding the dam. Since Jawai Dam is situated at the western fringe of the Thar desert, many deserticolous species of birds can be seen among the scrub vegetation.

OTHER KEY FAUNA

Jawai Dam Conservation Reserve is surrounded by small hillocks, agricultural fields, and village dwellings. A big population of Leopard is present in and around the reserve. This area is one of the best localities for sighting Leopard. Sloth Bear *Melursus ursinus*, Golden Jackal *Canis aureus*, Blue Bull *Boselaphus tragocamelus*, Northern Plains Langur *Semnopithecus entellus*, and Jungle Cat *Felis chaus* are easily seen in the area. The largest Crocodile *Crocodylus palustris* population of Rajasthan state is present in Jawai Dam. A wildlife census by the Forest Department in 2011 put their number at 288.

LAND USE

- Tourism and recreation
- Nature conservation
- Irrigation and drinking water

THREATS AND CONSERVATION ISSUES

- Eutrophication
- Pesticide runoff from agricultural fields
- Man-animal conflict
- Overgrazing
- Imminent threat of mining in the surrounding area

As the whole area is human-dominated, there is very little land under the Forest Department. However, the Rajasthan Forest Department has done commendable work in protecting the leopards for the last 15–20 years. Officially, there has been no records of poaching. As soon as a goat or a cow is killed by a leopard, compensation is provided to the owner so that retaliatory poisoning of the carcass does not happen. Forest guards regularly monitor the area and some local villagers have been appointed as watchmen, so they have a stake in leopard protection. At present, this 19.79 sq. km area has been declared as a Community Reserve, with the consent of the villagers. The Forest Department is trying to convince the remaining villagers to agree to the declaration of a Community Reserve across nearly 600 sq km landscape. Earlier it was a ‘Closed Area’, but after the amendment of the Wildlife Protection Act that brought two new categories of PA, Community Reserve and Conservation Reserve, the “closed area” concept has been removed. As the name indicates, local communities have to be deeply involved in a Community Reserve. But there is a problem. The granite rocks in the site are a perfect target for mining. The mining lobby of Rajasthan, along with the local leaders, claim that if Jawai becomes a Conservation Reserve, the villagers will lose control over their land. This is not correct, as under the community or conservation reserve concept, no one’s land can be taken over and no village will be removed – only destructive activities like mining will not be allowed in a community reserve.

At present only some resort owners derive the benefit of ecotourism. If the villagers also get benefit from increasing tourist traffic and home-stays are developed, a much larger Community Reserve will get their approval.

KEY CONTRIBUTORS

Satish K. Sharma, Asad R. Rahmani.

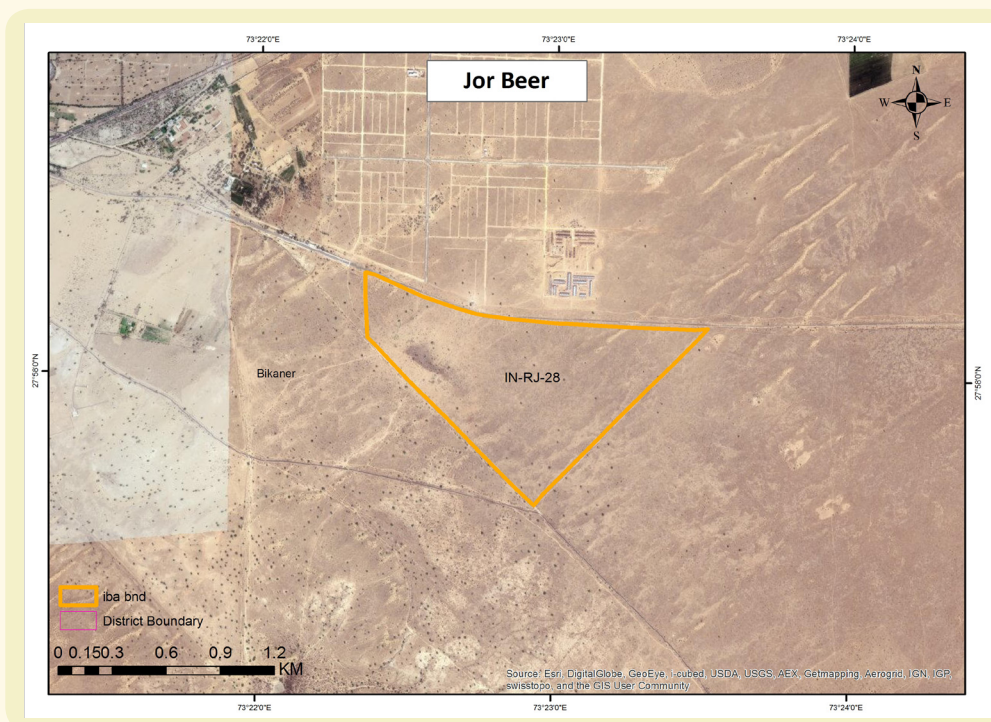
JOR BEER

IN-RJ-28

IBA Site Code	: IN-RJ-28	Area	: 20–25 sq. km
Administrative Region (State)	: Rajasthan	Altitude	: 738 msl
District	: Bikaner	Rainfall	: 100–125 mm
Coordinates	: 27° 57' 99" N, 73° 22' 59" E	Temperature	: -2° C to 49° C
Ownership	: State	Biogeographic Zone	: Arid
		Habitats	: Scrubland

IBA CRITERIA: A1 (Threatened species), A4i (1% of global population)

PROTECTION STATUS: Not officially protected. Proposal for Conservation Reserve



GENERAL DESCRIPTION

The Jor Beed region, spread over an area of 20–25 km, is the carcass dumping ground of Bikaner and surrounding areas. It attracts thousands of vultures and other raptors, besides crows, ravens, and dogs. The vegetation of the region is thorny and scanty, dominated by *Prosopis cineraria*, *Salvadora oleoides*, and *Ziziphus nummularia*. Hundreds of Yellow-eyed Pigeon *Columba eversmanni* are found in winter, in perhaps the largest known wintering ground of this species in India.

Jor Beed has extreme desert conditions where the maximum temperature reaches 49.5 °C and the minimum -1°C to -2 °C. Seven species of vultures can be seen in the area. Recently, the Government of Rajasthan proposed it as a Conservation Reserve. We are including this as an IBA mainly due to the presence of many species of vultures, eagles, and Yellow-eyed Pigeon.

AVIFAUNA

According to the reports contributed by many birdwatchers on the website www.ebird.org (accessed on July 18, 2015), 80 species of birds are reported from Jor Beed. These include sightings of a Greater Spotted Eagle *Clanga clanga* by Shah Jahan on November 21, 2014, a Pallas's Fish-eagle *Haliaeetus leucoryphus*, and an Imperial Eagle *Aquila heliaca* by Garima Bhatia on February 2, 2015. All three eagles are listed as Vulnerable. Seven species of vultures have been recorded at Jor Beed: Long-billed *Gyps indicus*, White-rumped *Gyps bengalensis*, Griffon *Gyps fulvus*, Himalayan Griffon *Gyps himalayensis*, Red-headed Vulture *Aegypius calvus*, Cinereous *Aegypius monachus*, and Egyptian Vulture *Neophron percnopterus* (Khatri 2013a). A small population of the Egyptian Vulture is resident in this area. A few hundred, may be a thousand Steppe Eagle *Aquila nipalensis* are also found along with vultures, feeding



During the last few years Jor Beer conservation reserve has become an important area for vultures and other raptors

Apart from Steppe Eagle *Aquila nipalensis* and Tawny Eagle *Aquila rapax*, Jor Beed has Black Kite *Milvus migrans*, House Crow *Corvus splendens*, larks, mynas, ravens, and babblers, which are attracted to this scavenging habitat. On February 13, 2012, carcasses of raptors were noticed at Jor Beed. Sharma *et al.* (2014) found gross and microscopic lesions, and diclofenac in the tissue in Steppe Eagle *Aquila nipalensis* in Jor Beed, evidence of the toxicity of diclofenac for this species. This paper suggested the possibility that diclofenac is toxic to other accipitrid raptors as well, and is therefore a potential threat to a wide

on carcasses. Tawny Eagle *Aquila rapax* is resident in the area and seen throughout the year.

Khatri (2013b) conducted a survey to study the home range of seven species of vultures in Jor Beed and about 40–80 km. around the Jor Beed area, from October, 2006 to March, 2011. He found that winter migrant vultures at Jor Beed have occupied 8,640 sq. km as their home range. The home ranges of various species overlapped, covering 74 villages between 27° 35' N to 28° 30' N and 72° 52' E to 73° 49' E.

Tawny Eagle *Aquila rapax* is also found in large numbers. The eagles mostly remain in the area throughout the day and hundreds of them can be seen roosting on trees, while the vulture numbers suddenly increase at mid-day, when fresh carcasses are dumped.

Sharma & Sundar (2009) have given an account of the Steppe Eagle *Aquila nipalensis* at Jor Beed from 2003 to 2006. They counted a maximum of 53 birds in March, 2004, 100 to 136 birds during January–March, 2005, and 89 birds in January, 2006. The birds arrived here in or after September and stayed up to the end of May.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Sarcogyps calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
------------------	------------------------------

VULNERABLE

Pallas's Fish-eagle	<i>Haliaeetus leucorhynchus</i>
Greater Spotted Eagle	<i>Clanga clanga</i>
Imperial Eagle	<i>Aquila heliaca</i>
Yellow-eyed Pigeon	<i>Columba eversmanni</i>

NEAR THREATENED

Cinereous Vulture	<i>Aegypius melanogaster</i>
Himalayan Griffon	<i>Gyps himalayensis</i>

range of scavenging species in South Asia.

OTHER KEY FAUNA

Among mammals, jackals and foxes are regularly seen in Jor Beed and nearby scrubland.

LAND USE

- Carcass dumps
- Agriculture
- Pasture

THREAT AND CONSERVATION ISSUES

- Stray dogs
- Skinning of carcasses
- Use of the veterinary painkiller diclofenac
- Shrinking of habitat due to construction
- Railway track

KEY CONTRIBUTORS

Asad R. Rahmani, Himmat Singh, Hemant Joshi, Sharad Purohit.

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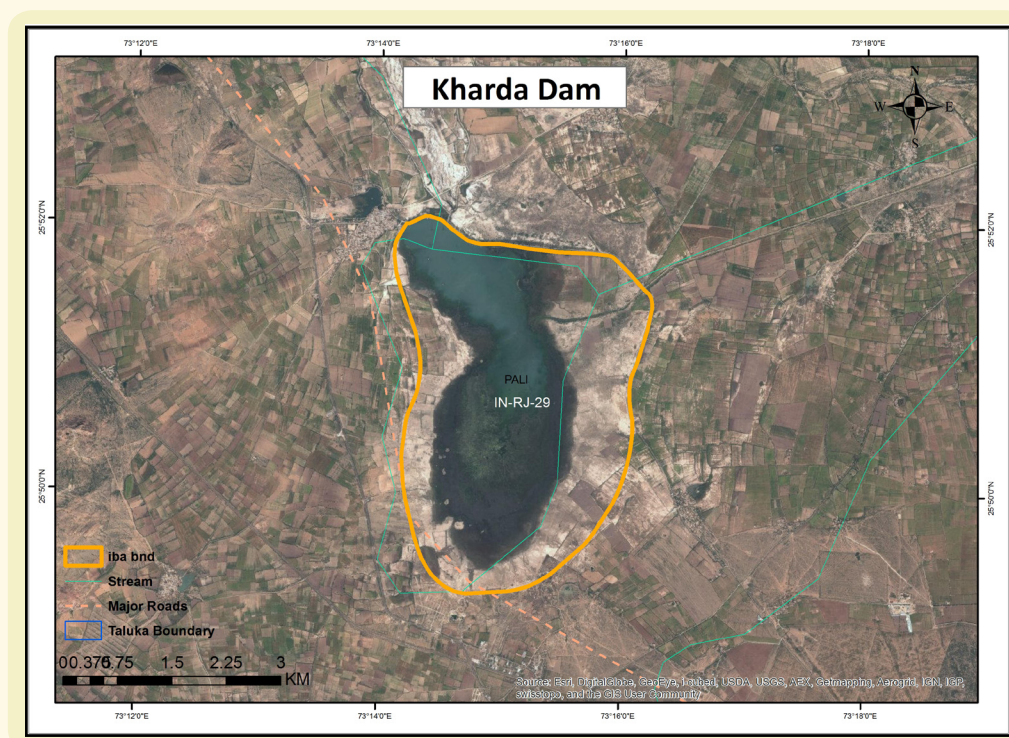
KHARDA DAM

IN-RJ-29

IBA Site Code	: IN-RJ-29	Area	: 17.0 sq. km
Administration Region	: Rajasthan	Altitude	: c. 200 msl
State		Rainfall	: 125-200 mm
District	: Pali	Temperature	: 2° C to 50° C
Coordinates	: 25° 51' 20.12" N, 73° 15' 3.37" E	Biogeographic Zone	: Arid
Ownership	: State	Habitats	: Wetland

IBA CRITERIA: A1 (Threatened species); A4iii (>20,000 waterbirds)

PROTECTION STATUS: Not protected officially.



GENERAL DESCRIPTION

Kharda Dam is situated c. 2.5 km east of village Kharda, which is on National Highway 65, about 50 km south of Jodhpur and 20 km north of Pali on the Jodhpur-Pali road. The village comes under Rohat *tehsil* of Pali district. The dam has a catchment area of c. 17–20 sq. km. Kharda is one of the places where gulls are seen in western Rajasthan. Very large numbers of Common Black-headed Gull *Chroicocephala ridibundus*, pelicans, Common Crane *Grus grus*, Demoiselle Crane *Grus virgo*, and Sarus Crane *Grus antigone* are seen in this area from Sardarsamand to Kharda Dam.

Another privately owned wetland nearby also provides refuge to birds when they are disturbed at Kharda Dam. The villagers are protective of the birds and are not involved in any kind of disturbance to the wetland.

AVIFAUNA

Till now about 75 species of birds have been recorded from the environs of Kharda Dam. Long-billed Vulture *Gyps indicus*, Red-headed Vulture *Aegypius calvus*, and Egyptian Vulture *Neophron percnopterus* are regularly seen in the area but breeding has not been reported. River Tern *Sterna aurantia* and Black-headed Ibis *Threskiornis melanocephalus*, both Near Threatened species are also seen. According to Himmat Singh (*pers. comm.* 2014), Sociable Lapwing *Vanellus gregarius* was seen twice in the Luni Basin nearby. A pair of Sarus Crane *Grus antigone* regularly breeds in the area.

Species like Great White Pelican *Pelecanus onocrotalus*, Common Crane *Grus grus*, Demoiselle Crane *Grus virgo*, were usually seen in this area in addition to gulls, terns, and waders that are seen in large numbers, sometimes in

DHRTIMAN MUKHERJEE



Three species of cranes, Common crane *Grus grus*, Demoiselle Crane *Grus virgo*, and Sarus Crane *Grus antigone* are found in Kharda Dam. Only Sarus is resident and breeds in the area, while the other two are purely migratory

thousands each. The main feature of this dam is the large span of shallow water where many species congregate in huge numbers. This is also a stopover site for many wader species. In a year in total more than 20,000 birds are seen using this wetland either as a stopover site or for wintering.

OTHER KEY FAUNA

The other fauna includes Long-eared Hedgehog *Hemiechinus auritus*, Nilgai *Boselaphus tragocamelus*, Chinkara *Gazella bennettii*, Golden Jackal *Canis aureus*, and Indian Fox *Vulpes bengalensis*.

LAND USE

- Agriculture
- Pasture

THREAT AND CONSERVATION ISSUES

- Tie-and-Dye industrial waste pollution
- Livestock grazing
- Encroachment on land
- Salinity

CRITICALLY ENDANGERED

Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Sociable Lapwing	<i>Venellus gregarius</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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NEAR THREATENED

Black-headed Ibis	<i>Threskiornis melanocephalus</i>
River Tern	<i>Sterna aurantia</i>

KEY CONTRIBUTORS

Himmat Singh, Renu Kohli

KEY REFERENCE

Link

India-WRIS wiki Water resources Information System of India
http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Kharda/_Kharda_Bund_JI01545.

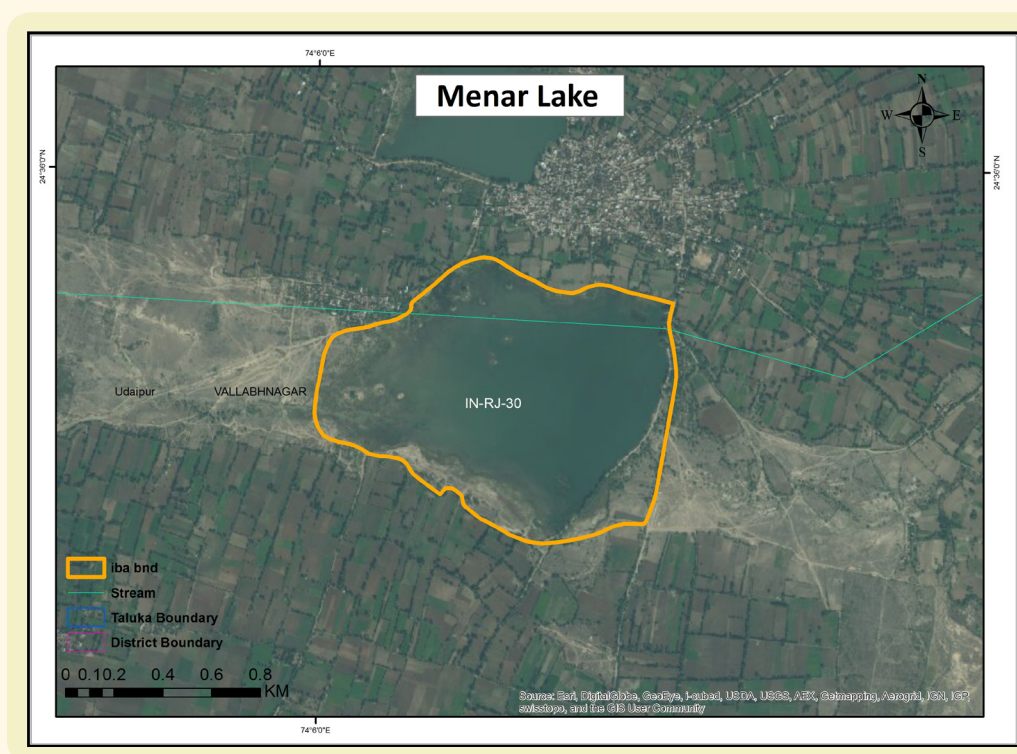
MENAR LAKE

IN-RJ-30

IBA Site Code	: IN-RJ-30	Area	: 60 ha
State	: Rajasthan	Altitude	: 480 msl
District	: Udaipur	Rainfall	: 650 mm
Coordinates	: 24° 35'16" N, 74° 06'43"	Temperature	: 4 °C to 42 °C
Ownership	: Gram Panchayat (village council)	Biogeographic Zone	: Semi-arid
		Habitats	: Fresh water lake

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Protected by local public.



GENERAL DESCRIPTION

Southern Rajasthan is rich in avian diversity (Sharma & Tehsin 1994) and Menar Lake is a fine example. Like Menar, other nearby wetlands like Ghasa, Badwai, Nagawali, Mangalwad, and Vagan are also rich in aquatic birds. Local movement of aquatic birds is seen among these waterbodies, so they make a good complex of lakes providing habitats to birds and water to humans.

Menar is a small village on the Udaipur-Chittorgarh National Highway (NH-76), 50 km away from the tourist destination Udaipur. There are two ponds in the village, the smaller Brahm Talab (c. 10 ha) and larger Dhand Talab (c. 50 ha). The distance between the ponds is c. 1 km and both are situated on the outskirts of Menar village. These ponds are typical monsoonal wetlands, which get most of their water

from rainfall. One side of each pond has aged mango trees *Mangifera indica*. Dhand, the larger pond, has a 2.0 km long embankment, with thick growth of Babool *Acacia nilotica* and Vilayati Babool *Prosopis juliflora*, besides Mango. A Shiva temple is present on the embankment of Brahm Talab, and a smaller one near Dhand Talab. Thick growth of *Ipomoea carnea* is present near the edges of both the ponds. Patches of *Typha angustata*, *Scirpus littoralis*, and other *Scirpus* spp. are scattered in shallow water. Natural vegetation consists of *Hydrilla verticillata*, *Ceratophyllum demersum*, *Vallisneria spiralis*, *Potamogeton crispum*, *Azolla pinnata*, *Ipomoea aquatica*, *Trapa natans*, *Spirodela polyrrhiza*, *Wolffia arrhiza*, and others.

Menar is a village of Menaria Brahmans, with c. 12,000 residents. They celebrate *Jamrabij*, a local festival

held every year. The ponds are owned by the *Gram Panchayat*. Menar Lake is among the best protected lakes in Udaipur region, and a good example of community participation. The villagers, including the *sarpanch* (headman), are very protective of the pond and the birds. They make efforts to save the birds (Himmat Singh, *pers. comm.* 2014).

The villagers were interviewed and gave the following information: The lake water is not utilized for any purpose, like bathing, drinking, farming, or fishing.

- As well as wetland birds and cattle can use the water.
- The water requirement of the village is met with bore wells which receive water recharge from the ponds.
- Every person in the village is made responsible not to drain any waste into the pond.
- The villagers have ensured social fencing of the ponds, so no poaching or fishing is allowed. The villagers have built community toilets, and most villagers have their own toilets so that water is not polluted with waste during rains.
- All community toilets are located downstream of the catchment area of the pond.

AVIFAUNA

About 62 species of aquatic birds have been reported in the Menar ponds. If terrestrial birds are included, the total is almost 100 species. Among them Knob-billed or Comb Duck *Sarkidiornis melanotos*, Cotton Pygmy-goose *Nettapus coromandelianus*, Indian Spot-billed Duck *Anas poecilorhyncha*, and Lesser Whistling-duck *Dendrocygna javanicus* are resident. The Vulnerable White-naped Tit *Parus nuchalis* is seen in the thickets of *Acacia nilotica* growing on banks of the lake. Eurasian Bittern *Botaurus stellaris* is seen in these waterbodies during winter (Jain 2014).

During winter in December and January, most of the time between 8,000 to 10,000 waterfowl are found in these ponds. In a year, more than 20,000 waterfowl visit this area as many use the wetland complex as stopover site. This is proved by sudden influx of birds for some days and subsequent decrease in their numbers. A detailed long-term study is required. Common Crane *Grus grus*, Rosy Pelican *Pelecanus onocrotalus*, Greater Flamingo *Phoenicopterus roseus*, Black-headed Ibis *Threskiornis melanocephalus*, Glossy Ibis *Plegadis falcinellus*, Eurasian Spoonbill *Platalea leucorodia*, Bar-headed Goose *Anser indicus*, Greylag Goose *A. anser*, Gadwall *Anas strepera*, Northern Shoveler *A. clypeata*, Northern Pintail *A. acuta*, Common Teal *A. crecca*, Common Pochard *Aythya ferina*, Spotted Redshank *Tringa erythropus*, Wood Sandpiper *Tringa glareola*, and

CRITICALLY ENDANGERED

White-rumped Vulture *Gyps bengalensis*

VULNERABLE

Sarus Crane *Grus antigone*

Indian Skimmer *Rhynchops albicollis*

White-naped Tit *Parus nuchalis*

NEAR THREATENED

Oriental Darter *Anhinga melanogaster*

Spot-billed Pelican *Pelecanus philippensis*

Painted Stork *Mycteria leucocephala*

Black-necked Stork *Ephippiorhynchus asiaticus*

Lesser Flamingo *Phoeniconaias minor*

Ferruginous Duck *Aythya nyroca*

Black-tailed Godwit *Limosa limosa*

Black-headed Ibis *hreskiornis melanocephala*

Great Thick-knee *Esacus recurvirostris*

Oriental Darter *Anhinga melanogaster* are some of the main attractions of Menar lakes. Great Crested Grebe *Podiceps cristatus* can be seen almost round the year (Bhatnagar *et al.* 2013). The Indian Skimmer *Rhynchops albicollis* is often reported but there is no breeding record. However, Sarus breeds in the area.

OTHER KEY FAUNA

Menar Lake is surrounded by agricultural fields and village habitations. No large wild mammalian species of conservation concern is found in the area. Golden Jackal *Canis aureus*, Bluebull *Boselaphus tragocamelus*, Hanuman Langur *Semnopithecus entellus*, and Jungle Cat *Felis chaus* are sometimes seen in the area.

LAND USE

- Agriculture

THREATS AND CONSERVATION ISSUES

- Eutrophication
- Pesticide runoff from agricultural fields

KEY CONTRIBUTORS

Satish K. Sharma, Deependra Singh Shekhawat, Nihal Jain

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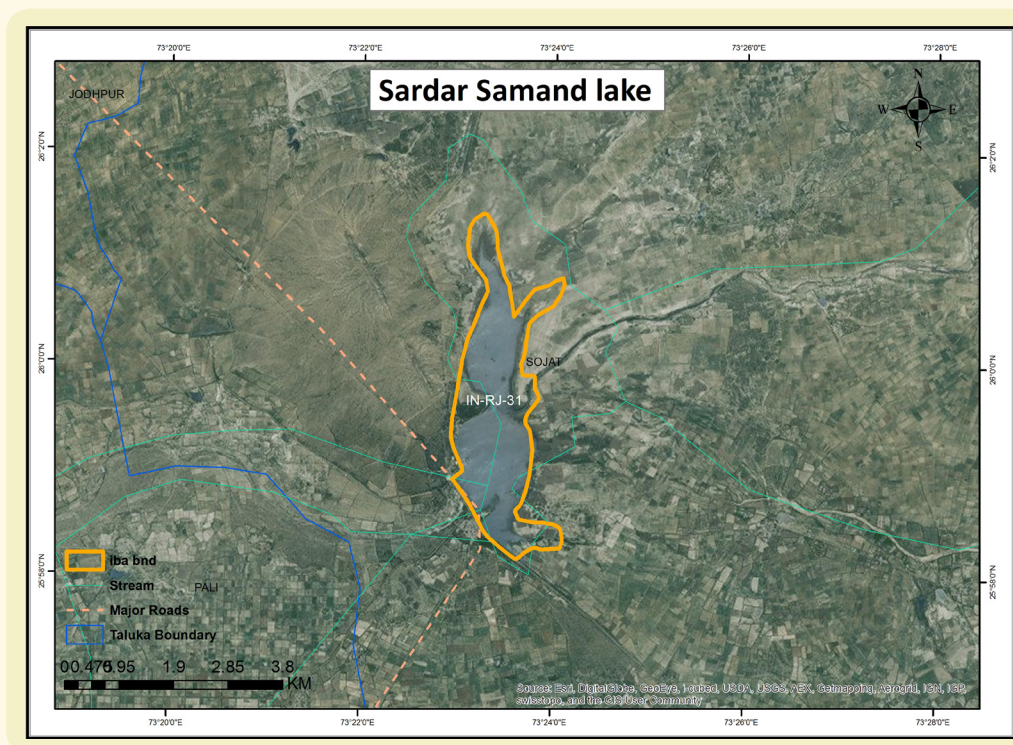
SARDAR SAMAND LAKE

IN-RJ-31

IBA Site Code	: IN-RJ-31	Area	: 500 ha
Administrative Region (State)	: Rajasthan	Altitude	: 220 msl
District	: Pali	Rainfall	: 200 mm - 300 mm
Coordinates	: 25° 59' 5.79" N, 73° 23' 3.88" E	Temperature	: 2° C to 50° C
Ownership	: State	Biogeographic Zone	: Arid
		Habitats	: Wetland

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Private (well protected).



GENERAL DESCRIPTION

Sardar Samand Lake is c. 60 km south-east of Jodhpur off the Jodhpur-Pali route. This privately owned lake attracts many species of migratory birds. The lake, as well as the route to it provide a visual treat to bird photographers. On a hill overlooking Sardar Samand Lake is a summer palace of the late Maharaja Umaid Singh, built in 1933, which was once a hunting lodge. The palace has now been converted into the Sardar Samand Lake Palace Resort. Along the sides of the lake, there are many vantage points from which to view the birds on the water. Several migrant birds visit this waterbody in good numbers. For many years, Sarus Cranes *Grus antigone* have been found breeding in this area. Several species of migrant and resident birds like ducks, flamingos, pelicans, cranes, terns, and gulls are also regular visitors (Vijayan & Vijayan 2013). The lake is privately

owned by the erstwhile Maharaja of Jodhpur, who ensures its protection strictly for birding. *Acacia juliflora* and *A. nilotica* grow like fencing around the lake, and these trees provide roosting sites for the Black-crowned Night-heron *Nycticorax nycticorax*.

AVIFAUNA

About 200 species of birds have been recorded from Sardar Samand Lake and the surrounding areas (Singh 2002). Mainly ducks, cranes, gulls, including Brown-headed Gull *Chroicocephalus* (= *Larus*) *brunnicephalus*, Egyptian Vulture *Neophron percnopterus*, River Tern *Sterna aurantia*, and Black-headed Ibis *Threskiornis melanocephalus* are regularly seen in the area. Great White Pelican *Pelecanus onocrotalus*, Common Crane *Grus grus*, Demoiselle Crane *Grus virgo*, and Sarus Crane *Grus antigone* were normally



CHOTU KHAN

Three species of cranes including the resident Sarus crane, are seen in an around Sardar Samand Lake

CRITICALLY ENDANGERED	
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
ENDANGERED	
Egyptian Vulture	<i>Neophron percnopterus</i>
VULNERABLE	
Dalmatian Pelican	<i>Pelecanus crispus</i>
Marbled Teal	<i>Marmaronetta angustirostris</i>
Sarus Crane	<i>Grus antigone</i>
NEAR THREATENED	
Oriental Darter	<i>Anhinga melanogaster</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurantia</i>

seen in this area. There is a record of Marbled Teal *Marmaronetta angustirostris*. In addition, gulls, terns, and waders are also a prominent feature of this dam. The large span of the dam has good species congregation at far shallow backwaters of the lake. In a year, more than 20,000 waterbirds including ducks, waders, cranes, gulls and terns use this wetland. For many waders, the shallow backwaters of this lake in the otherwise arid biotope makes attractive place to spend few days as a stopover site. Possibly gulls and terns also use this wetland as stopover site because sometime sudden influx is noticed. We need detailed multiple-year study at this site. It will also be interesting to study old hunting records from the archive of the erstwhile Maharaja to know the changes, if any, in the avifauna of this IBA.

Earlier White-rumped Vulture *Gyps bengalensis* was

extremely common but it has almost disappeared due to the use of killer-drug diclofenac, but Long-billed Vulture *G. indicus* is occasionally seen. So is the case of Red-headed Vulture *Aegypius calvus*. The Egyptian Vulture *Neophron percnopterus* is still fairly common in and around villages, particularly on garbage dumps. The Cinereous Vulture *Aegypius monachus* is found in winter in the area.

OTHER KEY FAUNA

The large mammals in the area include Blue Bull or Nilgai *Boselaphus tragocamelus*, Chinkara or Indian Gazelle *Gazella bennettii*, Golden Jackal *Canis aureus* and other species.

LAND USE

- Agriculture

THREATS AND CONSERVATION ISSUES

- Livestock grazing
- Insecticide, fertilizer leaching
- *Prosopis juliflora* infestation

KEY CONTRIBUTORS

Himmat Singh, Renu Kohli

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Singh, H. (2002) *Birds of Sardarsam and and Balsamand Lake Palace*. Bharat Printer, Jodhpur. Pp. 52.

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